

YANOMAMI HUNTING PATTERNS:  
TREKKING AND GARDEN RELOCATION AS AN ADAPTATION  
TO GAME AVAILABILITY IN AMAZONIA, VENEZUELA

BY

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by

Kenneth Robert Good

To the Hasupiwëth<sup>h</sup>eri, who showed me the ways of  
Yanomami hunting and especially to my wife Yarima  
who so courageously endured the trials  
of both her world and mine.

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This dissertation is a multi-community study of hunting productivity in relation to residence patterns. The study was based on traditional interfluvial villages which have adopted a strategy for avoiding game depletion in any settlement area. They have done this primarily by spending up to 40% of the year on community wayumi treks into unsettled forest areas. Hunting yields increase by 60% on these treks over the home base yields. When gardens become exhausted of crops they clear new ones 10-15 kilometers away, thus requiring relocation of the village to unexploited areas. Although there is normally sufficient land for expansion of the gardens, they prefer to move to distant areas. In the case of the new garden, as well as

the treks, it appears that the men plant at a rate with the idea in mind that they will be absent from their home base for periods of time or relocate in approximately two years. Thus, they periodically run out of plantains, the staple food, and revert to eating wild foods in the forest.

A third way of minimizing depletion pressure on the home base and assuring large quantities of meat at one time is the distant 5-day communal hunt with large game as the principal goal.

Meat is the only food which is distributed village-wide. This distribution fosters village cohesion. When a village grows beyond 90 to 100 people, however, the distribution leaves some members out and becomes more restricted to a sub-lineage. This leads to cracks in the village harmony. During treks larger communities split up and, in some cases fail to reunite at the home base. In 90% of these cases village fission occurs, and each faction establishes its own garden and communal house.

CHAPTER 1  
THESIS, FIELDWORK, AND METHODS

Statement of Problem

The Yanomami are a much-studied tropical forest people who live in the Amazonian rain forests of southern Venezuela and northern Brazil (figure 1). Their villages seldom attain populations much greater than 150 persons. As settlements approach this limit, factional disputes intensify and lead to the fissioning of villages into two separate settlements that on average are spaced 16.7 kilometers or more apart. It has been hypothesized that this fissioning results from the high level of disputes between males over access to women in combination with the absence of formal political institutions capable of resolving such disputes (Chagnon 1977,1983). When villages are small, kinship relations supposedly function as an effective substitute for political relations. But when they are large, kinship relations become too diluted and the centrifugal forces generated by disputes over women cannot be controlled.

As the village grows in size and varies in composition, it becomes increasingly difficult to keep order and peace. . . . By the time a village approaches 100 to 150 people, such fights over women are so frequent that the group elects to fission rather than attempt to keep an uneasy internal peace. (Chagnon 1977:40-41)

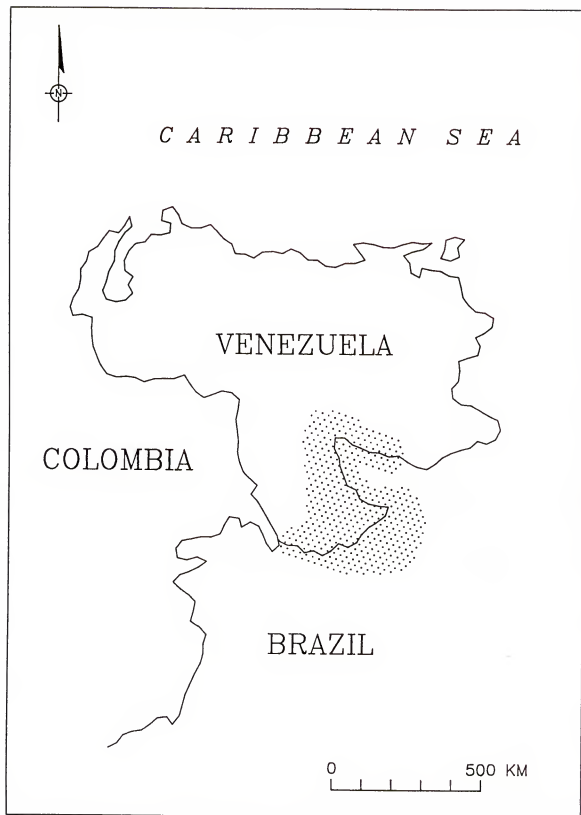


Figure 1. Yanomami settlement area.

This hypothesis fails to consider why the Yanomami have not developed the requisite political institutions for resolving intra-village disputes that in other parts of the Orinoco-Amazon region allowed the formation of villages of 1,000 or more people (Carneiro 1960, 1961; Roosevelt 1980). Before one can assert that a people are unable to live in large villages because they cannot control their inclination to fight with each other, one must be able to show that they have a mode of production that is capable of sustaining larger villages than those observed. If the subsistence base cannot support larger, more sedentary settlements, it would suggest that it is this limitation and not a lack of political institutions that prevents the Yanomami from living in larger more sedentary settlements (Gross 1975; Harris 1979a, 1979b, 1984, 1987; E. Ross 1978; Ross and Ross 1980; J. Ross 1980; Ferguson 1984).

This dissertation will show that the maintenance of small communities, frequent village moves, and intermittent nomadism are adaptive means of assuring adequate consumption of meat, the primary source of proteins and fats in the Yanomami diet. Given the absence of domesticated animals, the low productivity of the interfluvial tropical forest with respect to game animals, the negligible contribution which fishing has traditionally made to their diet, and their reliance on plantains and bananas as staple crops, the Yanomami do not have the option of living in larger and more

permanent settlements. Their villages must fission regardless of whether kinship relations are diluted or not.

It will be shown that the Yanomami mode of production cannot maintain permanent yearround settlements despite the small size of their villages. The Yanomami rarely stay in their villages for more than four consecutive months and frequently for as little as two months. For about six months of each year they must reside elsewhere away from the villages, either at distant gardens or deep in the forest at temporary camps. Only in this manner can they successfully carry out their essential foraging tasks which include not only hunting for large game by men but collection of fish, insects, turtles and other vertebrate species as well as numerous fruits and vegetables and firewood by women.

#### Narrative of Fieldwork

The fieldwork on which this study is based was carried out during 14 consecutive years from 1975 through 1988. Total time in the field was 68 months. Table 1 lists the duration and location of fieldwork.

I began my fieldwork at the village of Hasupiwēt<sup>h</sup>eri<sup>2</sup> on April 1, 1975, after a month residence at the village of Ihirēmawēt<sup>h</sup>eri.<sup>3</sup> At the time of my arrival, Hasupiwēt<sup>h</sup>eri had already established a new garden about a half day walk inland at a site called Poreyanimopit<sup>h</sup>aki. It was on a

Table 1. Days by village and location during which data were recorded for this dissertation.

Year	Months	Village	Location	Days	Period #
1975	Apr-Dec	Hasupiwëth <sup>h</sup> eri	Hashaawa	243	1
1976	Jan	"	"	14	2
	Feb	"	New Garden (Pore)	30	3
	Mar-Apr	"	Hashaawa (trek)	58	4
	May	Mokaritat <sup>h</sup> eri	Oipui	6	5
	May-Jun	Hasupiwëth <sup>h</sup> eri	Hashaawa	47	6
	Jul	"	New Garden (Pore)	14	7
	Jul-Aug	Nanimapiwëth <sup>h</sup> eri	Shukumi	45	8
	Sep	Hasupiwëth <sup>h</sup> eri	Hashaawa	21	9
	Oct	Hiomisit <sup>h</sup> eri	Shinamayopi (trek)	18	10
	Nov-Dec	Hasupiwëth <sup>h</sup> eri	New Garden (Pore)	59	11
1977	Jan-Mar	"	"	64	12
	Apr	Hawarowëth <sup>h</sup> eri	"	26	13
1978	Oct	Shuimuwëth <sup>h</sup> eri	Ihiremawë	23	14
1979	Mar-Jun	Hasupiwëth <sup>h</sup> eri	Wawatoi	79	15
	Jun-Jul	Nanimapiwëth <sup>h</sup> eri	Krokema	18	16
	Jun-Jul	Hasupiwëth <sup>h</sup> eri	Wawatoi	17	17
1980	Mar-Jun	"	"	75	18
	Dec	"	"	15	19
1981	Jan	"	"	10	20
1982	Oct-Dec	"	" (trek)	52	21
1983	Jan	"	" (trek)	31	22
	Feb	"	New Garden (Iro kai)	28	23
	Mar-Apr	"	" (trek)	67	24
	Jul-Aug	"	Iro kai	36	25
	Aug-Sep	"	" (trek)	29	26
	Sep-Oct	"	Wawatoi	21	27
	Oct	"	Iro Kai	24	28
	Nov-Dec	Patahamit <sup>h</sup> eri	Hashaawa	61	29
1984	Jan	"	"	28	30
	Apr-Jun	"	"	85	31
	Aug-Dec	"	" (trek)	127	32
1985	Mar-May	"	Waratat <sup>h</sup> eri (trek)	45	33
	Jun-Jul	"	" (trek)	28	34
	Jul-Aug	Hasupiwëth <sup>h</sup> eri	Wawatoi	34	35
	Aug-Sep	"	Iro Kai	21	36
1986	Feb-May	"	Wawatoi	89	37
	May-Jun	"	" (trek)	29	38
1987	Dec	"	Wawatoi	4	39
1988	Jan-Apr	"	"	110	40

TOTAL 1805



chance encounter during a return visit to their old garden at Hashaawē that we made contact with them. This old garden is located on the banks of the Orinoco River between the Guajaribo and Peñascal rapids approximately 200 meters above sea level (figure 2). The community consisted at that time of 119 persons who had split off the previous year from another group of 89 people who, in 1975, lived on the opposite side of the Orinoco about 2 kilometers upstream at the garden of Patahami.

The Guajaribo rapids, approximately half way between the last mission on the upper Orinoco River and my base village, served as a geographical barrier to river travel, thus ensuring a high degree of isolation of the communities upriver, even those which were located on the Orinoco. Because of the convenience of the riverine location, I adopted this site as my base of operations and built a small hut to store my supplies. During the first 9 months I made trips downriver every 2 to 3 months to re-supply. Invariably the Hasupiwē<sup>h</sup>eri were away at their new gardens when I returned, and I spent 1 to 3 weeks alone until they arrived, usually after one of the younger men had discovered that I was back.

Because the Yanomami are traditionally non-riverine (even today communities that reside on major waterways are the exception), I decided that Hasupiwē<sup>h</sup>eri would serve as a point of departure for research in communities further

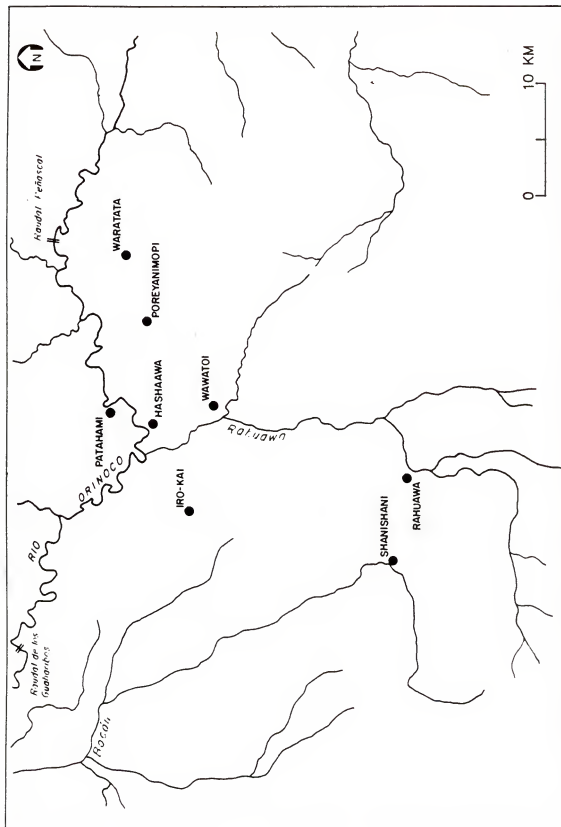


Figure 2. Garden sites occupied by Hasupiwet<sup>b</sup>eri, Poreyanimopitheri, and Patahamitheri from 1975 to 1988.

inland. While learning Yanomami language and measuring, for comparison their subsistence as an example of a riverine group, I also used my stay with the Hasupiwët<sup>h</sup>eri to acquire guides and informants and to prepare for expeditions south to contact communities in the Siapa River region (see figure 3).

The tasks of making several trips downriver, installing myself with the Hasupiwët<sup>h</sup>eri at Hashaawë, and learning a minimum amount of language consumed the first 5 months in the field. Although I was able to immediately begin to accompany the village on hunting and gathering trips and observe events within the community, controlled recording of subsistence data did not begin until 5 months after my arrival.

Nonetheless, during my first month with the Hasupiwët<sup>h</sup>eri I was also able to make my first expedition south to contact interfluvial communities where data on subsistence activities later would serve as the basis for determining the typical interfluvial tropical forest adaptation that is characteristic of over 90% of the Yanomami in Venezuela at the present time.

In April 1975, I accompanied a group of Hasupiwët<sup>h</sup>eri on a trip to the Kopariwët<sup>h</sup>eri where I was the first non-Yanomami to make contact with them. The community consisted of 151 inhabitants and was made up of 2 lineages: the Mokaritat<sup>h</sup>eri and the Ashitowët<sup>h</sup>eri. This village had



historical and genealogical relationships with Hasupiwët<sup>h</sup>eri, both having lived together some 20 years back at Patarohat<sup>h</sup>aki.

My research plan was to study four communities in depth: 1) a large non-riverine community; 2) small non-riverine community; 3) a large riverine community; and, 4) a small riverine community. The Kopariwët<sup>h</sup>eri, because of their size and location, would served as the large non-riverine group. On this first trip inland I began to acquire information on their genealogical relationships and garden histories and made plans to return for purposes of collecting subsistence data.

In addition, I was able on the trip to determine the settlement pattern of numerous villages further south of the Kopariwët<sup>h</sup>eri, most of which belong to a related group of uncontacted communities known collectively as the Shamat<sup>h</sup>ari. I became familiar with this group of communities on future expeditions in 1976, 1977, 1979, 1982, 1983, 1984, and 1986. All of their villages had the distinctive attractions of not being located on rivers and of exploiting only very small creeks for hunting and gathering. Small fish and crabs are caught by hand in these creeks, mostly by the women. Accessibility to these communities is difficult and only possible by walking for days and sometimes weeks through hilly jungle. For this reason they had remained uncontacted until my arrival.

The Hasupiwët<sup>h</sup>eri, as it turned out, could be regarded not only as a riverine settlement, but also as a non-riverine village, for they later moved to the new inland garden sites at Poreyanimopi and later still to Wawatoi (figure 2). This allowed me to make the comparisons between interfluvial and riverine settlements, in one instance between different communities, and in the other between the same community in the two different habitats.

In 1979, Hasupiwët<sup>h</sup>eri fissioned into 2 small groups of 57 and 38 individuals. I resided with each of these groups, which provided me with data on small interfluvial communities. Thus, the same group of individuals was studied as they passed from being a large riverine community to a large non-riverine community and finally to two small non-riverine communities.

#### Regional Studies

As already mentioned, the region between the Orinoco and the Siapa rivers at the time of my arrival had yet to be explored. After making my first expedition into the area I discovered that there were 11 communities, most of which were situated on the upper reaches of the rolling hills which characterized the terrain from the Orinoco to the Siapa river and beyond into Brazil. Since access to the area is quite difficult overland and because of the remoteness, I decided that rather than relocate, I would make several trips and reside at these communities for short

periods of time. Between 1975, and 1986, I made 15 expeditions and resided at 13 communities for periods of time varying between 4 and 26 days to determine the demographic characteristics, garden histories, and trading and kinship relationships, as well as the areas exploited for hunting and community trekking activities (described below).

Hunting yields were also recorded while in residence at these communities, although I realized that my stay in many cases would be too short a time to permit comparison with the communities where I carried out long-term studies. Nevertheless, these data provided a general perspective for a whole region of unacculturated Yanomami communities living in the typical interfluvial habitat.

#### Supplementary Field Experiences

A research position which I accepted at the Max-Planck Institut drew me away from the analysis of my 1975-77 data. But at the same time I was able to make return trips to the Yanomami in 1978, 1979, and 1980, during which I continued collecting data on hunting and protein consumption in relation to village growth, fission, and relocation. A subsequent contract with the Indian Census Bureau of Venezuela delayed the writing of my data even more, but again brought me back to the Yanomami for another full year and into new uncontacted areas of Yanomami settlement. In December of 1982, however, I presented a partial analysis of

these data at the American Anthropological Association meetings in Washington D.C. The 1982 field stay was extended by my own initiative to December 1984, and then to periods of several months in 1985, 1986, and lastly to a five-month stay in 1987-88.

Thus, while the interpretation and write-up of my data has been long in the making, my field stays with the Yanomami over the last 14 years allowed me to be in direct contact for some period of time in each calendar year from 1975 to 1988 (a total of 1805 days). This provided both a long temporal perspective as well as a regional one.

I believe that despite numerous publications on the Yanomami there as yet is no in-depth account of their traditional subsistence behavior. Certainly there are a number of misrepresentations of it. I hope that this study, in addition to adding to previously published data, will improve upon the theoretical arguments and explanations that have been applied to the Yanomami. I am also certain that it can be demonstrated that the relationships of meat consumption are far from negligible and that in no way is the protein hypothesis even moribund, let alone "dead" (Neitschmann 1980).

#### Field Methodology

While certain observations were possible from the inception of field studies, the difficulties of communication with people with minimal experience with the



outside world, led me to spend much time settling into the community of Hasupiwēt<sup>h</sup>eri and learning their language. In addition, because at the time of my arrival the Hasupiwēt<sup>h</sup>eri were in the process of relocating to a new interfluvial garden, they had no shapono (communal house) on the Orinoco. Instead they were sheltering themselves with the provisional structures used on wayumi treks.

My first hut, unfortunately, was constructed directly on the banks of the Orinoco, 400 meters away from the temporary shelters the Hasupiwēt<sup>h</sup>eri had made while exploiting the river garden. This seriously impeded daily observation of community activities, and I had to construct another house adjacent to the village. Eventually even this arrangement proved inadequate for close observation of village activities, and I abandoned the house as a living area and moved into the circle of family shelters, keeping the hut to store my supplies. Despite these inconveniences during the first 5 months, I was able immediately to begin accompanying hunters on one-day hunts (rami) to record hunting areas in distance and time and yields, efficiency of bow and arrow hunting, and rates by species of animals encountered.

In keeping with the objectives of the research proposal the following kinds of data were recovered, each to be discussed in greater detail below:

- 1) One-day (rami) hunts: areas, frequency, yields per hunt, and success rates.

- 2) Multiple-day (heniyomou) hunts to distance areas: yields per hunter hour and per day; areas exploited, and species killed.
- 3) Pre-dawn (yaikou) and dusk (weyai) hunts: species sought, yields, distances traveled.
- 4) Fishing activities for both men and women: locations, techniques (most fish were acquired by bare hands and therefore fishing, in part, is also associated with gathering activities, particularly those of the women).
- 5) Gathering excursions: fruits and other wild foods collected by both men and women and mixed groups.
- 6) Gardening activities: various stages, time invested, crops planted.
- 7) Time allocation studies of subsistence activities for men and women.
- 8) Intra-village meat distribution: patterns of sharing of individual and communal hunting yields.
- 9) All of the above measurements were made at the home base, new gardens, and during wayumi treks.

#### Observation Techniques

When it was physically possible, data were gathered by direct observation. Alternate methods such as periodic spot checks within the communal house were used only as a supplementary technique when measurements of larger samples of individuals over an extended period of time were required

(see Werner et al. 1979:308, for use of spot checks and some of the limitations of this method).

Thus, I accompanied hunting parties on as many hunts as possible to determine the exact area covered, animals flushed, shots taken, stalking strategies, species preferences, and decision to terminate the hunt. Also, I observed other activities engaged in while the hunter was in the forest were recorded such as gathering, honey collection, fishing, etc. It was not uncommon for one or more men to set out to hunt and abandon this objective to engage in other activities as unexpected opportunities presented themselves. Because these alternate pursuits do not always prove successful, any attempt to determine time spent in hunting by questioning other individuals who did not accompany the hunter entails a high error factor. A man or group of men who may have spent 2 hours chopping out a bee hive high in a tree only to find it empty or producing so little that they consumed it before returning home may not report this as part of the time spent on their 6-hour hunting trip. Certainly their relatives who remain at home would be unaware of this activity. I found this to be a shortcoming of Hames' (1980) data collecting technique (see critique in chapter 5). The techniques employed in gathering data for each activity are described below.

One-day hunts (rami)

Over a 12-year span I accompanied one or more hunters on approximately 250 rami hunts. Although during various periods of time I possessed a shotgun, I either left it behind or did not use it during the hunt. I rarely used it for my own purposes and these personal hunts are not included in the data sets used for this analysis. No one in any of my research communities had ever fired a shotgun. All hunting was done with bows and arrows.

For each daily hunt the hour of departure and return to the communal house was recorded to determine the time spent on these hunts. Normally I followed the hunter or hunters and observed search and tracking techniques and recorded all game spotted or flushed.

With the aid of a compass I drew maps showing the route of each hunt, including all streams and the points where trails were left to cross the forest (t<sup>h</sup>iherimou). Likewise, the exact positions where an animal was shot were recorded. These served also as reference points. After going on dozens of hunts, other individuals whom I did not accompany could describe their hunts in detail by referring to specific points in the forest where on a previous occasion we shot an animal, or shot and missed, or where a certain stream flows into another.

For smaller animals I carried a scale with a capacity of weighing up to 25 kilos. The animal was weighed and

recorded on the spot before and after it was gutted, which was usually done at the last stream before arriving home. The hunters also bathed in the stream. Heavier animals were weighed at the village (usually in the gutted or "dressed" state) where I kept a larger scale (ungutted large animals were weighed on heniyomou and wayumi treks during which I carried the larger scale).

Frequently in a hunt other activities were engaged in, such as collecting and eating fruits, honey, insects, Brazil nuts, etc. The time engaged in these activities was recorded to determine actual hunting time. Yanomami men, as well as the women, engage in food gathering, so it is common for a hunting trip to become primarily a gathering activity. Once again, time allotments cannot be determined by spot checks in the village or by questioning relatives. Such remote data recording is further confused by the fact that the Yanomami employ the term "rami huu" for both hunting animals and gathering food. Only by accompanying the foragers can the fieldworker record with any degree of certainty to what end time and energies were spent and exactly what area of the forest was involved.

Once my language skills improved and I acquired a thorough knowledge of the surrounding areas of each residence site I did everyday questioning of the men who went on hunts as to what area they covered, what animals were spotted, whether they took any shots and what other

activities they carried out I did this upon my return from a hunt, the following morning or when I stayed in the shapono to attend to other matters. I regard this "in house" hunting data as a useful supplementary source of information. But this form of data collection was never used as the primary source of information, and I used it only after I had been on many hunts over many months at the home base, new gardens, heniyomou hunts and wayumi treks.

### Sampling

My strategy for data collecting throughout the project was to measure as many subsistence-related events as field conditions would allow. For approximately the first 100 hunts I accompanied individuals from the community as a whole. Once I became integrated into the community of Hasupiwët<sup>h</sup>eri, I tended to establish a closer association with one sub-group, primarily because of the difficulties of maintaining close contact with all members of a large community. As a result I came to accompany on most of the hunts 11 adult men (of a total of 31) who comprised a sub-lineage of individuals who lived in the section of the communal house where I hung my hammock. As a result, constant close observation was possible and information was readily available either by questioning or from daily conversations.

The activities of the other community members were recorded either by direct observation (time of departure for

an activity, time of arrival, game brought home) or by censusing on a daily basis the area covered, animals sighted, shots missed and other events. For this reason residence directly within the communal house was essential.

#### Communal multiple-day hunt (heniyomou)

The heniyomou, which will be discussed in detail in chapter 2, is a communal hunt in which most of the adolescent and adult men leave the village and camp in the forest for a period of 4 to 6 days to engage exclusively in the pursuit of game animals. Normally a new site is selected each night, although usually 2 nights are spent at the last camp. The entire day from dawn to dusk is dedicated to hunting. Frequently young boys accompany the group and carry food supplies and help in constructing the shelters and gathering firewood. In the process they also learn the skills of the communal hunt.

As in the daily hunt, the only way to acquire reliable and accurate data for this activity is to accompany the group in the forest. Since normally there was only one hunting group, documenting all hunters and total yields was not a problem. Frequently in larger communities, however, 2 groups would depart for different forest areas or set out as a single party and split into 2 or more groups after the first night. In these instances careful questioning of the group which I did not accompany was necessary to acquire the

data for the entire event. Again, the acquisition of reliable information was possible only after having accompanied many heniyomou hunts to the numerous regions exploited from each village site. This enabled the phrasing of appropriate questions and the familiarization with geographical points of reference and techniques employed in the hunt.

The area hunted and the animals sighted and killed for each day of the heniyomou were recorded. A map was drawn indicating the location of each camp and the nature of the terrain and areas hunted around the site. Detailed accounts were kept of the hunting parties as they split up each day to hunt in various directions, including the kin relationship of pairs and groups of hunters. The total time dedicated to hunting other activities and the basis for decisions of when to move on or terminate the hunt were also recorded. Finally, the motives for engaging in a heniyomou and the kin relationship and status of the individuals to whom meat was distributed within the community were noted (see discussion of meat distribution).

#### Pre-dawn (yaikou) and dusk (weyai) hunts

Since the yaikou hunts take place in near-darkness, the strategies and locales are somewhat different than for the day hunts. Because of these conditions they are much more difficult to document. For this reason I relied more heavily on the 11-man sample than I did for daylight hunts.



Most often these hunts were made by young single or married men (especially those to whom a girl has been betrothed) who leave in the pre-dawn hours waving burning firewood taken from the family hearth (the literal meaning of yaikou is to wave back and forth). They walk out to areas either just beyond the gardens or to a nearby stream in search primarily of roosting birds.

In order to acquire data for these hunts I had to request that I be awakened to accompany the hunters, between 4 and 5 in the morning. Time, distance, route and animals encountered were recorded. Frequently, if a hunter was unsuccessful by the time daylight arrived he would continue on to more distant areas and return as late as noon or even mid-afternoon. This transition from yaikou to rami was clearly distinguished by the hunting strategies, the arrival of daylight and the movement to other areas.

In other instances hunters may leave at pre-dawn but with the intention of going on a rami and returning at dusk. In these cases they travel in the dark beyond the yaikou area and begin the hunt at the break of dawn. These distinctions can be made only by accompanying the hunter. As in the other hunts, a village-wide daily census was kept by circling the shapono and questioning the adult men. This procedure provided data on how frequently each man went on yaikou and the approximate location as well as yield, success rates of shots taken, and animals encountered.

The weyai or dusk hunts were recorded in a similar manner as the yaikou. The major differences between these two hunts are the species of birds killed and the fact that on the weyai the hunters always returned home just before or after darkness. Recording of yields was more difficult by indirect data gathering since frequently the hunter returned after dark, cooked his catch and distributed it that night or early the next morning. Again the data from the sample of 11 men with whom I had close contact proved more important for this kind of hunt.

#### Fishing activities

The term fishing is used here for any means employed to acquire fish and crabs. Four general categories of fishing activity are hook and line, bow and arrow, drugging, and trapping with the hands. Of these, hook and line and bow and arrow fishing are primarily male activities while bare hand fishing is carried out predominantly by females. Hook and line fishing is a post-contact technique employing metal hooks and nylon line. Fish-drugging, in addition to the drug preparation, entails the use of the bow and arrow, clubs, and the bare hands. Thus it is engaged in by both males and females.

Since none of the villages I studied possessed canoes or flashlights, all fishing activity was restricted to daylight hours without the aid of watercraft. This is in sharp contrast to those communities located further down the

Orinoco at or near missions or other foreign settlements where nighttime fishing with the use of lights and canoes provides a significant part of the fish yields.

As in hunting, I accompanied the men on fishing trips, both while living on the Orinoco and at inland settlements. Since fish are a minor aspect of the diet of communities living in their traditional interfluvial setting and even for those living on the Orinoco but out of reach of most acculturative influences, the introduction of small quantities of fish line and hooks was not considered to be of great significance. These hooks which originated at the mission stations were normally acquired through village to village trading. During my stay others were acquired from me.

The yields of each fishing activity were recorded by species, weight, and total time invested per individual. When fish were drugged the time invested in stripping the bark from the trees and preparation for immersion in the water was recorded, again by direct observation on numerous occasions.

Fishing by trapping with the hands was carried out by groups of women, most often as part of their daily gathering trips. Included in this activity is fresh water crabbing. I went along on 234 of these gathering trips to record techniques, time invested, yields per person and location of the streams and ponds. As is the case in hunting, maps were

drawn and each site identified so that activities of other community members could be documented.

### Gathering activities

Gathering of foodstuffs from the forest is carried out primarily by groups of females, although men also accompany them if their assistance is needed for climbing up or chopping down trees. However, men also go alone, in pairs or groups to gather fruits, nuts, honey, and other foods. A man also goes with his wife to the forest where he may hunt while she gathers food or searches for crabs or fish in the streams.

It is common for the women to engage in gathering, crabbing and fishing on a single excursion. Because of the variety of activities on any excursion in the forest, the best way for the fieldworker to determine the time invested to acquire each kind of food procured is to witness firsthand the activities by accompanying the group.

It is more difficult to measure the production of female gathering activities than it is of men's hunting. First, women almost always gather in groups of as many as 15 individuals, while men most often carry out one-day hunts individually or in pairs. Moreover, the number of collected species is greater than the number of hunted species. In addition, while only a few hunters are successful on a particular day, every women on a collecting expedition brings back something and quickly distributes it to various

members of the village all at once. Finally, most gathered foods are cleaned and wrapped in leaves before arrival, and frequently it is impossible to determine the contents until they are roasted and opened for consumption.

Since women go gathering frequently (average 4.6 days per week) I accompanied groups of women on those days when little hunting was carried out. The duration and yields of each activity engaged in during the outing were recorded. Frequently adolescent or pre-adolescent girls accompanied the group to care for children while the mother was gathering. All individuals were recorded, and yields per capita were calculated. Although the young girls may not have participated in gathering, they enabled the mother to do so, and they were always given a share of the yield to take to their households. Women with infants who had no one to care for them were less productive than women who left their children at home.

Because of the difficulties of controlling the distribution of food acquired by gathering, I focused my data-collecting on the wives and female relatives of the 11-man sample of hunters with whom I had close contact. In those days when I did not accompany the gatherers I could weigh yields and determine the contents when they were eaten. This also enabled documentation of a cross section of the community gathering activities, since many of the wives went with their mothers, sisters and other relatives

living in different parts of the shapono. Nevertheless, foods were also weighed on outings in the forest to determine yields per gathering group.

Many of the foods brought home were distributed as soon as they arrived, and thus I had to weigh them immediately. The relationship of donors and receivers were also noted. Likewise, foods distributed after cooking were also recorded by relationship of the donor and receiver.

#### Gardening activities

Although the principal objective of my field research was to document animal capture, an analysis of any single part of the subsistence system must be made in the context of all food production activities. Since most of the time and energies of an adult male are dedicated to hunting and gardening, the nature of these investments, combined with the subsistence activities of the women, is crucial for understanding the ultimate effect on total food consumption.

Time allocation was documented for all activities related to gardening by both men and women. These studies were made at different kinds of sites: 1) old gardens; 2) gardens at the shapono (occupied garden); and, 3) new gardens (under development). In order to acquire this information I had to join the community in their periodic residences at old gardens for harvesting and consumption and at new gardens for purposes of clearing and planting. These stays lasted up to 2 and 1/2 months.

Documentation of the other activities was done at three principal levels for varying periods of time: 1) direct observation by accompanying an individual to the garden and recording time investment in each kind of gardening activity; 2) detailed daily recording of garden activities of the 11-man sample group (and their wives if they were married); and, 3) daily census of the entire community to determine the frequency of garden activity.

Each stage of garden development was observed to determine the time invested and the techniques of clearing, burning, planting, maintenance and harvesting. The areas of 23 gardens were measured and mapped by marking them off with cord and compass. Within the borders, 10-meter strips were also delimited with line and each plant drawn on a diagram of the garden to record crop spacing, composition and stages of maturation for each variety of plant. Crop production per garden was also recorded by numerous measures of yields per plant of all varieties found in the gardens. The spatial distribution of gardens in terms of kin relationships of the owners was also recorded.

The relationship of garden activities and production with seasonal changes, hunting and other activities was noted. Close attention was given to the association of periods of large production or exhaustion of crops and other activities such as heniyomou hunts, feasting and wayumi treks.

Lastly, the succession of garden development, abandonment and community relocation to a new garden was noted throughout the 14-year period. Residence time at each of the three categories of gardens was recorded as well as the differences in food consumption and other subsistence activities at these sites.

#### Dietary measurements

The following kinds of dietary measurements were taken for varying periods of time:

- 1) All varieties of food eaten within the community were recorded year round to determine the frequency of consumption and seasonal availability. This was done by direct observation within the communal house.

- 2) Dietary studies for intermittent periods of 3 days were made of an entire family. Initially these were carried out twice a month for three months, then once a month for nine months. These measurements proved to be the most difficult of the entire project. Everything consumed by nuclear family was recorded by variety and weight. Because of the necessity of constant contact with the individuals, I selected three families with which I had the closest relationship. Also, because of the requirement of uninterrupted observation, I made these measurements concomitantly with the time motion studies of daily activities (for each family, however, I made much longer and more frequent time-motion studies).



The most difficult aspect of the dietary study was to carry out an entire day of uninterrupted recording of all food consumption. When control was lost I had to discontinue the study for that day. Therefore, many of my dietary records indicate only foods eaten in the morning or until late afternoon. Frequently, the entire day's consumption was measured, but the consecutive 3-day period was interrupted.

Another problem arose when I could not observe all members of the family for the entire day. Oftentimes one person would leave for an extended period in the forest, and although most of the food consumed was recorded as it was eaten in the house, thorough questioning was necessary to determine any foods which might have been eaten in the forest.

In order to quantify food consumption each portion had to be weighed as it was about to be eaten, a task which necessitated a very intimate relationship with the family members. After weighing numerous portions of each food I was able to estimate quantities by sight so that approximate dietary records could be kept after more exact studies were terminated.

3) Measurements for longer periods of time were kept of meat, fish and other animal products. Again this was done at the individual, family, and village-wide levels. each for varying lengths of time and degrees of precision.

### Time allocation studies

The objective of this study was to determine how the Yanomami spend their time on a daily basis. Since time allocation measurements were already made for subsistence activities as each one was studied, the focus here was on all other activities.

To carry out these measurements close observation of small samples of individuals was made for short periods of time (1 to 5 days) every month for a total of 27 months. As in the dietary studies the recording of these data was a difficult task since an individual had to be accompanied at all times. Again, I took advantage of my close relationship with several families within the community. Several levels of data were recorded, each with a different degree of precision:

- 1) Individual, adult males and females, and adolescent males and females were observed throughout the entire day. Each activity and the total time it was performed were noted. With the aid of a stop watch I was able to measure those activities which experienced frequent interruptions, such as arrow-making and hammock weaving. Also the stop watch enabled the measurement of the various phases of an activity.

In some cases the daily record had to be aborted because of unavoidable interruptions of my observation. Nevertheless, estimates of average times spent on specific

activities could be determined from measurements made of activities completed prior to the interruption.

2) The activities of a sample of 11 families were documented on a daily basis throughout the year from 1975 through 1977, and for shorter periods in subsequent years through 1986. These data were acquired by direct observation and inquiry, and because of the number of individuals involved, were less precise than the individual studies. Nevertheless, they provided information on frequency of participation in each activity. i.e. basket weaving, hammock weaving, arrow-making, drug preparation, etc.

3) A spot system of recording throughout the day was made of the entire community. Data derived from this method is considered the least reliable and is used only as a crude form of determining the frequency of participation in the various activities. It yielded little information on the duration of each activity, and even for frequency counts was subject to error. An 8 AM check, for instance, of ongoing or planned activities could indicate an activity which might be terminated 15 minutes or two hours later. A 10 AM check would not provide this information. In addition, subsequent activities would be difficult to determine. A man, for instance, frequently takes his bow and arrows and leaves for the forest without indicating his intended activity. To ask him before he departs what he plans to do is likewise a very

unreliable procedure. Frequently, a man will say at 7 AM that he will stay home that day and an hour later go to his garden or leave to chop down a palm tree to make a bow. Or he may say he is going hunting and instead go to his garden or go fishing in a nearby stream. A great number of Yanomami subsistence activities are unsuccessful, and a person who returned empty-handed would give no indication of what he or she had done while away. Likewise, the reverse situation may occur. A man may say he is going hunting or fishing and, in fact, go nowhere or do something else outside the communal house. Probably the best description of the difficulties of measuring daily activities is that of the Tapirapé by Charles Wagley, which is remarkably appropriate for the Yanomami as well:

My records show that a man would leave early in the morning for his garden to cut the underbrush. He might work for two hours at that occupation and then decide to hunt, since he always went armed with bow and arrows. His hunting might well bring him in a circle toward the village, where he would be found in the takana at 2:00 p.m., weaving a basket. A day might produce any number of possible combinations of occupations. Likewise, expeditions from the encampment might involve shooting fish, then hunting, and then a decision to pick caja, a yellow plum-like wild fruit which grows on the savanna and ripens during the dry season. But if by chance in his wandering a man discovered a nest of wild bees, he would abandon all other pursuits to collect honey. With the exceptions of collective hunting parties and organized work parties for clearing gardens, daily activities were spontaneous and often determined by mood and chance. It was next to impossible to calculate the man-days expended on any economic activity (1977:53).

Therefore, spot checking for this study was given lowest priority as a data collecting procedure and in no instance was it used as a sole or primary means of measurement (Gross 1984, points out some useful uses of this method). Instead preference was given to constant direct observation of individuals and a sample of families.

#### Intravillage meat distribution

Sharing and distribution patterns measured in this phase of the study was limited to those of game animals, since meat is the single item, food or non-food, which is distributed village-wide. Studies of other kinds of food-sharing were also made but will be discussed elsewhere.

Sharing of meat from small animals was limited to a few individuals. Data was derived mostly from the sample of 11 families where these less noticeable distributions could be observed.

The most important form of meat-sharing occurred when a large animal (most often collared or white-lipped peccary) was killed. Accounts were kept of the hunter, the person who carried it home, the person who cooked it and to whom it was distributed in the community. Each portion was weighed and classified as to quality of cut, amount of bone, etc.

The exact relationship of the donors and receivers was noted, as well as any other social factors such as status or relationship of donor and receiver in the context of past interpersonal or community events. In addition, those

individuals not included in the distribution were noted and documented by the same criteria mentioned above. As a follow up to these distributions any subsequent comments or interpersonal relationships between donors and receivers were noted.

#### Community wayumi treks

During wayumi treks the entire community packs up all of its belongings and sets out to travel and camp in the forest for as long as 3 months. The shapono house is temporarily abandoned, because rarely does anyone stay behind. Because of this temporary relocation of the entire community, the only way to document the activities of the wayumi is to accompany the group. Simply questioning them upon their return would reveal very little reliable information on individual and community activities or subsistence yields.

I accompanied 21 wayumi treks for a total of 88 weeks over a period of 12 years. Many of the periodic campouts at old and new gardens mentioned above overlap with wayumi treks and are quite similar in nature. For purposes of analysis these garden campouts are considered separately from treks in the forest.

Observation of individuals and documentation of subsistence yields were much more difficult on the wayumi than at the shapono. Small temporary shelters are constructed in virgin forest areas with little concern for orientation. The proximity of the community members most

often is different than it is within the shapono, and a group of families which are closely associated in the shapono frequently construct their shelters at opposite ends of the encampment. In addition, thick undergrowth obscures the vision from one shelter to another, and it was not uncommon for some families to camp on opposite sides of a stream. Therefore, the data gathering techniques had to be adjusted for the wayumi. The number of individuals whose activities were observed directly had to be reduced. Indirect forms of data collecting such as periodic observation and detailed questioning, however, were still possible. Despite these difficulties, direct observation continued to be the primary means of gathering information.

Although my major goal on wayumi treks was to determine the hunting yields, all activities were documented employing the measuring techniques mentioned above and were as follows:

- 1) A map of the entire trek was drawn indicating the location of each campsite in relation to streams and other geographical features.
- 2) The total time spent walking between each campsite was noted. Since many rests were taken because of the heavy burden of women these times were also measured.
- 3) All activities engaged in while on the trails, subsistence or otherwise were recorded.

- 4) All animals sighted were noted and indicated on the map. All animals killed were weighed and recorded.
- 5) The time of day when the camp was begun and the total time invested in the construction by the family members were measured.
- 6) Time allocation studies were made of non-subsistence activities to compare with the data from the communal house (drug-use and shamanistic chanting, for instance, occurred much less frequently on wayumi and gardening not at all).
- 7) All game and fish acquired by the entire community were weighed. To carry this out I recruited the assistance of several young boys to inform me of all catches.
- 8) Dietary studies were made of 1 to 3 families to compare the differences in foods consumed while on wayumi.
- 9) Distributions of meat and other foods were measured to determine the effect that different proximities of families had on intra-village sharing and distributions.

#### NOTES

1. Fieldwork carried out in 1975-1976 was funded by the National Institute of Mental Health, Grant No. NIMH 5 Ro1 MH 26008-SSR (N. Chagnon, principal investigator). Fieldwork from 1978 to 1981 was funded by the Max-Planck Institut, Forschungsstelle für Humanethologie, West Germany. Write up funds were provided by the Amazon Research and Training



Program of the Center for Latin American Studies at the University of Florida.

2. Names which terminate in <sup>h</sup>eri refer to the community of people. The suffix <sup>h</sup>aki which means hole or clearing and derives from the term <sup>h</sup>ikari <sup>h</sup>aki or garden clearing. Most often the community is referred to by the name of a past garden, and often times, even after the community relocates several times it continues to be referred to by the old garden name. This varies according to the speaker. Thus some people refer to Mokaritat<sup>h</sup>eri by that name, which derived from an old garden site. Others, however, call the community Kopariwët<sup>h</sup>eri, Oposhayaopit<sup>h</sup>eri, Oipiwet<sup>h</sup>eri, and several other names of past gardens. This inconsistency of reference name causes a great deal of confusion until one becomes familiar with the garden history of each community.

3. We arrived at Ihirëmawët<sup>h</sup>eri as a group of five: N. Chagnon, William Sanders, Robert Carneiro, Ray Hames and myself. Sanders was there only to survey the area and left the next day. After 9 days we all went down to Hasupiwët<sup>h</sup>eri where Chagnon instructed the men to build me a house on the banks of the Orinoco. The village was located about 1/4 of a mile away up a slight hill. On April 1, 1975, Chagnon took Hames back to Ihirëmawët<sup>h</sup>eri, and Robert Carneiro and I stayed at Hasupiwët<sup>h</sup>eri until the end of April. Hames abandoned his project at the end of April, returned to the U.S. and initiated fieldwork at the Ye'kwana village of Toki in May.

## CHAPTER 2 SUBSISTENCE ACTIVITIES

### Environment of the Orinoco-Siapa Region

The area between the Orinoco and the Siapa rivers which contains the 16 communities studied for this report lies between 1° and 2° 30' north latitude, and 64° and 65° west longitude. The total area consists of 1570 square kilometers (604 square miles, see figure 4a-b). The topography consists predominantly of rolling hills ranging from 250 to 600 meters above sea level. The area is crisscrossed by small streams, which ultimately reach either the Orinoco or Siapa rivers by way of two to four interconnecting streams. Most of the communities are situated 100 to 400 meters from these streams which serve as a source of drinking water and for bathing. During the dry season the streams frequently dry up completely, and holes must be dug in the dry bed for water. In the driest months one can travel for an entire day without encountering flowing water and those stream beds which still contain water are no more than 1/2 to 1 meter in width. Geographically the area is classified as part of the Guayana shield and consists of volcanic rock with spotted areas of deep red soils.

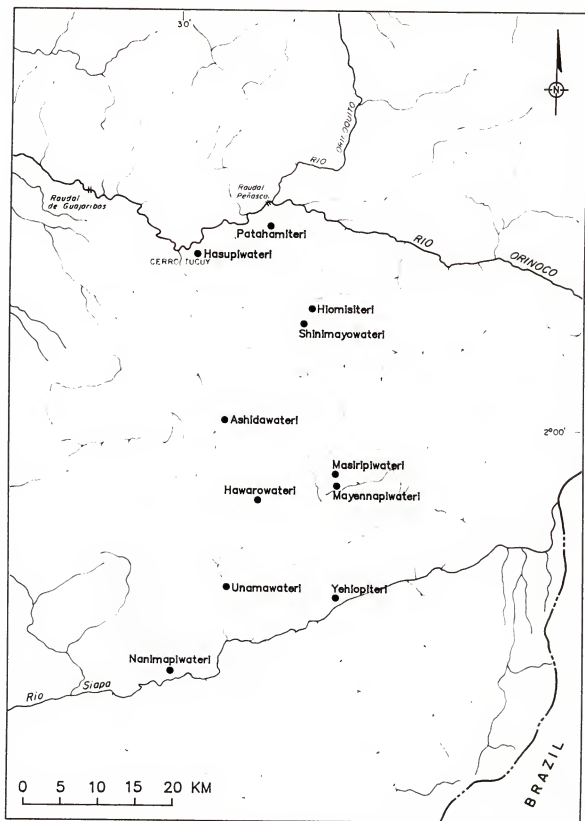


Figure 4. Orinoco-Siapa region in 1976.

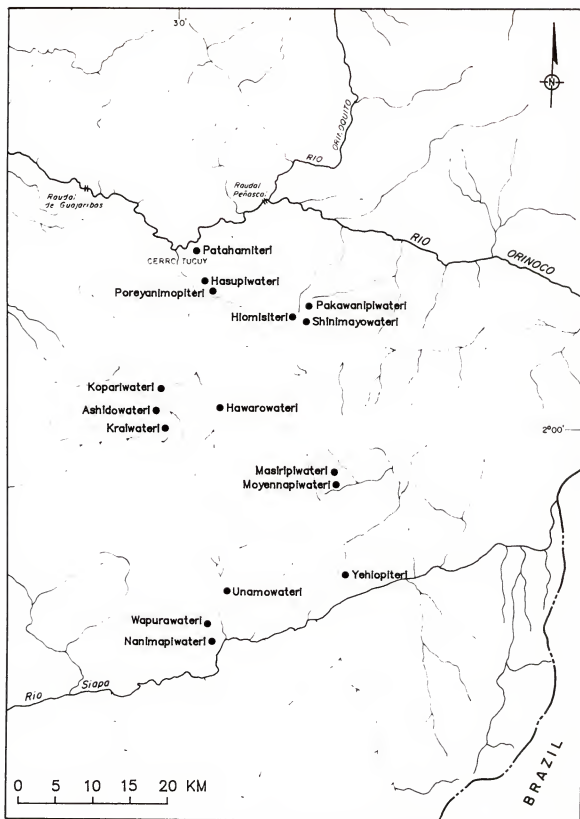


Figure 5. Orinoco-Siapa region in 1983.

The base village of Hasupiwê<sup>h</sup>eri was situated at approximately 200 meters above sea level on the Orinoco River; the inland garden of Wawatoi, was slightly higher. The mean maximum temperature on the upper Orinoco is 26°C (79°F). Average monthly temperatures range from 24°C (75°F) to 29°C (84°F). The diurnal temperatures average 38°C (100°F) in the day and 16° (60°F) at night. Seasonality is limited to changes in precipitation with only a change of 1 to 2 degrees Centigrade in average temperature.

The year is divided up into approximately 6 months rainy and 6 months dry, but this can vary markedly in any given year. Some years the dry season may last for 7 or even 9 months creating drought conditions and obstructing river travel in areas where outboard motors are used. At the onset of the rains the rivers can rise a meter or more in a few days. In the interfluvial regions, the traditional Yanomami habitat and where most still live, the streams rise sharply sometimes flooding out the forest. Despite the swollen streams and muddy forest floor, trekking and visitation activities are carried out throughout the year. On the upper Orinoco the rainy season normally begins in April but can vary 4-8 weeks earlier or later. Rain usually falls in sudden downfalls and the sky clears up within an hour or so. The vegetation consists of dense primary tropical forest with a covered canopy broken only at waterways and house and garden clearings. Most often the

underbrush, because of the tree covering, is sparse but frequently intertwined with vines which impede traveling in many areas.

#### Gardening

The Yanomami represent one of a minority of tribes in lowland South America whose staple food consists of plantains and bananas. Approximately 74% of their diet by weight consists of these cultigens (see table 2). Manioc, which is the most common staple of other Amazonian tribes is less than 1% of the Yanomami diet. Although most villages grow some manioc, it is eaten primarily when other foods are not available. Because of its long term durability while still in the ground, it can be extracted over a period of several months after the tubers are full grown. In addition, the Yanomami lack the knowledge and technology to process the manioc (Manihot esculenta dulcis) tubers into flour (mañoco), a form preferred by other tribes, particularly the Makiritare (Ye'kwana). Yanomami communities living near Makiritare villages and mission stations have acquired this technology and manioc plays a greater role in their diet.

The Yanomami grow their crops in gardens cleared by slash and burn techniques. They first clear the undergrowth, fell the large trees and then burn the brush and branches in large mounds. Unlike many other tropical forest horticulturists, they do not have distinct clearing

Table 2. Garden crops (Averages of 17 gardens from 3 communities)

Crops	% garden space <sup>a</sup>	% diet by weight	gm. protein per 100 gm <sup>b</sup>
Plantains ( <u>Musa paradisiaca</u> ) <sup>c</sup>	71.9	59.1	1.0
Bananas ( <u>Musa sapientum</u> )	16.8	14.6	1.2
Ocumo ( <u>Xanthosoma sagittifolium</u> )	8.4	1.5	2.0
Corn ( <u>Zea mays</u> )	0.2	0.2	4.1
Manioc ( <u>manihot esculenta dulcis</u> )	1.3	0.4	1.7 <sup>d</sup>
Peach palm fruit ( <u>Bactris sp.</u> )	0.4	4.4	2.8 <sup>d</sup>
Sweet potato ( <u>Ipomoea batatas</u> )	0.1	0.1	2.0
Sugar cane	0.1	* <sup>e</sup>	0.3
Tobacco	0.3	0.0	0.0
Cotton	0.3	0.0	0.0
Magical plants <sup>h</sup>	0.1	0.0	0.0
Totals	99.9 <sup>f</sup>	76.3 <sup>g</sup>	

<sup>a</sup> measurements were taken at 3 gardens at Hashaawa-t<sup>h</sup>aki during periods 2 and 4; 6 gardens at Poreyanimopi-t<sup>h</sup>aki during periods 11 and 12; 5 gardens at Wawatoi-t<sup>h</sup>aki during period 18; and 3 gardens at Iro kai-t<sup>h</sup>aki during period 24.

<sup>b</sup> Leung, Woot-Tsuen-Wu, Food Composition Tables for Use in Latin America. 1961.

<sup>c</sup> All scientific names from Schnee, L., Plantas Comunes de Venezuela, 1960.

<sup>d</sup> Ochse et al., Tropical Agriculture, taken from Smole 1976. Hunter, 1969, taken from Lizot, 1977, reports 7.81 gm. per 100 gm.

<sup>e</sup> negligible amounts

<sup>f</sup> does not total to 100 due to rounding.

<sup>g</sup> this column does not represent the entire Yonomami diet.

<sup>h</sup> these plants are used primarily to assure success in the hunt, but also for a variety of other benefits.

and burning seasons. Of 11 communities in the upper Orinoco-Siapa region where I observed gardening activities, the general pattern was one of clearing, burning, planting throughout the yearly round. There was only a tendency to do more burning during the drier months just before the rainy season. During the first months of the rainy season burning is still possible since the scorching sun quickly dries out any dampening effect of the afternoon rains. As many of the woods are quite hard (many of the trees in Yanomami region have wood that approaches or exceeds a specific gravity of one, see Carneiro 1979) water penetration is very slow as is most clearly revealed in the firewood used in the family hearths which is collected throughout the year.

The most common location of the garden is adjacent to the communal house structure. It is a relatively small area of the normally dense forest where the ground is cleared of brush and vines. A very special advantage for the women is the nearby availability of fallen trees which they chop for firewood. Women and children go for firewood and sit on the ground in groups and chat before returning with their loads. Both sexes use the edges of the garden for defecating, particularly after dark, which eliminates the need to go out into the forest.

All of these conveniences could not be possible were the garden located a distance from the shapono. The garden



becomes an extension of the house, a familiar area where one can feel more secure than in the forest.

The garden area is not cleared at one time. Rather a small section is burned and planted so that the crops can begin the growing cycle. Over a period of a year or so the area is gradually extended. Thus, the plantains will mature in a sequential pattern enabling harvests over a long period. Periodically they are depleted, and the community embarks on a wayumi trek as described below.

The men prefer to make their gardens on hilly ground, since they believe the water drainage is beneficial to crop growth and that in low areas where water settles, the plants "drown". They, therefore, clear garden areas somewhat further away than they normally would if they have good drainage.

The community garden is divided into a number of separate but contiguous plots cultivated by individual adult men. Young unmarried men also clear a small section, especially those who live with a widowed or divorced mother.

Although these plots are not delimited by visible markers the exact borders are recognized by the community members down to the last plant. The Yanomami have no concept of land ownership, but once an area is cleared and planted, the crops become the absolute property of the individual gardener. Any breach of this ownership causes serious disturbances of intra- and intervillage harmony in

the form of verbal disputes (mostly among the women) and physical aggression among the men which can lead to club fights and even homicide (Good 1989).

In the early stages of a new garden the men pull up the weeds which grow near the plants. Once the plantains have grown tall and provide a canopy over the garden few weeds grow and the garden requires very little additional care. Nevertheless, each man keeps close watch over his plot, visiting it almost every day when the community is living at the gardens. He carefully monitors the stage of maturation of each plant and props up any which are leaning from the weight of the fruit. These brief visits (at<sup>h</sup>ou) enable him to separate himself from the communal house where privacy is virtually non-existent. On rare occasions severe storms cause damage to a number of plants, a loss which is taken with great pain by the owner.

The average size of 22 plots from 3 communities was 0.18 hectares (0.5 acre) with a range of .08 to 0.31 hectares (0.2 to 0.8 acre). The most influential men of the community almost always have one of the larger plots. One reason is that these men are usually older and hunt less. They hunt less not only because of their diminishing strength and marksmanship, but also because they have more prestige and a larger number of younger kinsmen (brothers, sons, sons-in-law etc.) from whom they are able to receive meat in the intravillage distribution without having to

reciprocate as is expected of the other men. They, therefore, have more time to work in their gardens and reciprocate by providing plantains to a greater number of community members than do the other men.

Approximately 89% of the total cultivated area consists of plantains and bananas (table 2). The only other crop planted in significant quantities is ohina, (Xanthosoma sagittifolium) a root crop highly prized by the Yanomami. As already mentioned, manioc is grown in small quantities and is a less desired food. Exceptions to this are provided by those communities in varying degrees of acculturation, especially those living near missions or Makiritare settlements.

Another major difference between Yanomami horticultural practices and those of many other Amazonian societies is that women contribute very little to gardening activities (see table 3). Their single responsibility is to harvest and carry plantains to the village. Even this chore is performed frequently by the men, particularly when visitors arrive or a feast is held.

All of the other garden activities are carried out by the men: clearing, burning, transfer of plantain suckers, and planting. Women sometimes help to plant corn, but this is a very minor activity and is carried out only once or twice a year for an hour or so.

Table 3. Average time spent on subsistence activities per day while living at the home base.

	Men		Women	
	Hours/day	%	Hours/day	%
Hunting	2.16 <sup>a</sup>	52.94	----	-----
Fishing	0.26	6.37	0.36	9.09
Gathering	0.56	13.73	2.78	70.20
Gardening	1.10	26.96	0.22	5.56
Firewood	----	-----	0.60	15.15
TOTAL	4.08	100.00 <sup>b</sup>	3.96	100.00 <sup>b</sup>

<sup>a</sup>averages are for all seasons and derived from periods 1, 3, 4, 6, 11, 15, 18, 28, 29, and 37. Only data recorded from direct observation are included here.

<sup>b</sup>These percentages, as indicated, reflect only the principal subsistence activities. Other activities, such as making containers and utensils and cooking, are not included here.

### New Garden Site

While in residence at the new garden after it has become the home base, the men continually make and plant small expansions. But often these crops will not be harvested until they have already moved to another garden located from a 1/2 to 1 day brisk walk from the shapono. The reasons for clearing the new garden this far from the shapono instead of extending the present garden will be discussed in chapters 3 and 4. They start this new garden during a hiatus in their garden production, usually before the new crops are mature enough to harvest. They begin by clearing some underbrush and then chopping down the trees. Plantains are sometimes transported there from the old garden for consumption while working on the new clearings. Periodic return trips are made when quantities diminish. As this distance is too far to commute on a daily basis the entire community camps at the new site while it is being cleared and planted. After 1 to 2 months they return to harvest the crops at the main garden which matured in their absence.

When an area of the new garden is ready to be planted the men cut the suckers from their old gardens and carry them to the newly cleared area. They are quite heavy and only a few are taken at a time. Meanwhile, the women go gathering just as they do when residing at the home base. Since meat is as much in demand here as elsewhere, the men also participate in frequent hunts. Some who have less

affinity to gardening go more frequently on hunts. Their gardens will be smaller than average, but these men provide a greater proportion of meat. Should they run short of plantains before others do, a brother or other relative shares his harvest.

As the garden gets larger and crops begin to produce at the new garden (most often ohina roots produce first) the community resides there for longer intervals and spends less time at the main garden. After about one year, when the first plantains begin to produce, the community stays for several months at the new garden. When the garden is in full production a shapono is constructed, and the move is completed. Since the old garden continues to produce after the final move, the community periodically camps at the old garden for 3 to 6 weeks for several more years to harvest plantains and bananas which are still producing, as well as the perennial peach palm fruit. These crops are harvested and transported to the new house. Some varieties of bananas continue to produce for two to three years after the village relocation. After this time the abandoned garden becomes so overgrown that access to plants becomes very difficult (and even dangerous, since the grasses and dense thorny scrub which grow in a cleared plot are a favorite haven for poisonous snakes). Eventually the garden is abandoned altogether and revisited only to harvest peach palm fruit or get arrow cane.

After 1 to 2 years at the new garden the men begin to clear another one in a distant part of the forest. Also, as already mentioned, small gardens are cleared in areas where wayumi are regularly held. Each village of the Orinoco-Siapa region has at least 2 gardens. It is not unusual for a village to have 3, and in some cases 4 gardens, in various stages of production (table 4).

In addition to returning for peach palm fruit, the men also like to go on heniyomou hunts to abandoned garden areas which are well outside the radius of the territory covered on the daily rami hunts. They do not hunt in these areas because animals are attracted to the garden, nor do they hunt in the old garden itself, contrary to that which is reported for other South American tribes (Balee 1985; Linares 1976; Paolisso and Sackett 1985; Ross 1978). Rather, since they once lived in that region, they are familiar with the trails and areas where animals are likely to be encountered. Also the old garden often provides some food for them during their stay.

Figures 5-12, show one sequence of garden moves over a period of 11 years. While living at garden site Wawatoi the men went to the old gardens of Hashaawë and Iro Kai for heniyomou hunts. These were areas where they once lived and thus were familiar with the landmarks. The regrowth is very dense and full of low thorny branches and passage is next to

Table 4. Number of producing gardens and average residence time before moving the home base for 8 different villages from 1976 to 1985.

Village	no. of simultaneous gardens <sup>a</sup>	residence time at the home base (months)
Hasupiwët <sup>h</sup> eri <sup>b</sup>	3	20.8
Patahamit <sup>h</sup> eri <sup>c</sup>	3	24.3
Wawatoit <sup>h</sup> eri <sup>d</sup>	3	21.5
Poreyanimopit <sup>h</sup> eri <sup>e</sup>	2	19.5
Hawarowët <sup>h</sup> eri <sup>f</sup>	3	20.0
Kopariwët <sup>h</sup> eri <sup>g</sup>	2	24.0
Eshemowët <sup>h</sup> eri <sup>h</sup>	4	16.0
Warathat <sup>h</sup> eri <sup>i</sup>	3	----
average	2.9	21.7

<sup>a</sup>These include the still producing old garden(s), home base and the new garden.

<sup>b</sup>periods 1-12

<sup>c</sup>periods 1-12

<sup>d</sup>periods 15-23

<sup>e</sup>periods 15-23

<sup>f</sup>periods 5-16

<sup>g</sup>periods 5-16

<sup>h</sup>periods 29-32

<sup>i</sup>periods 29-32



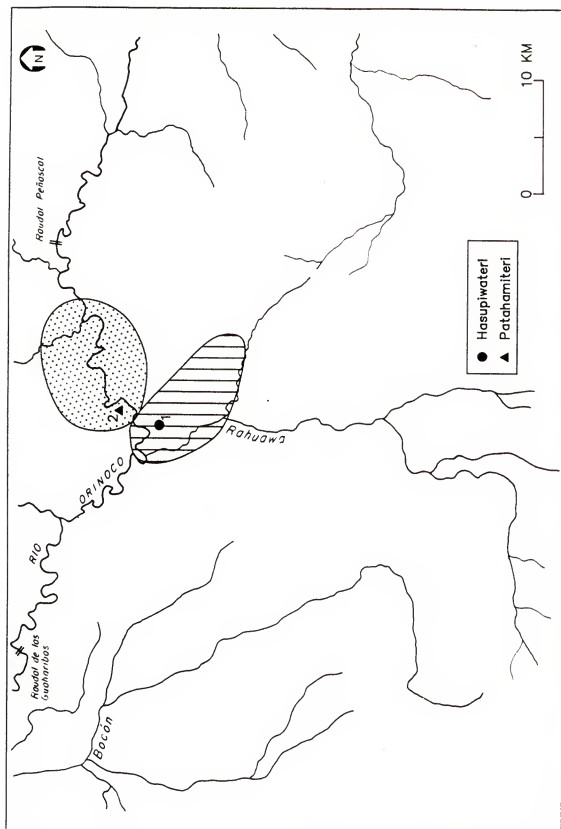


Figure 6. Home bases of Hasupiwetheri and Patahamitheri 1975.

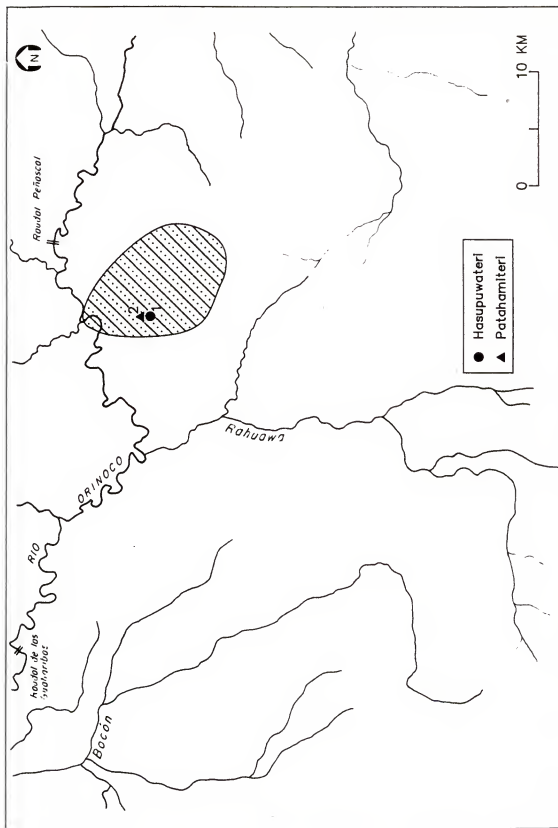


Figure 7. Home bases of Hasupiwetheri and Patahamitheri 1977.

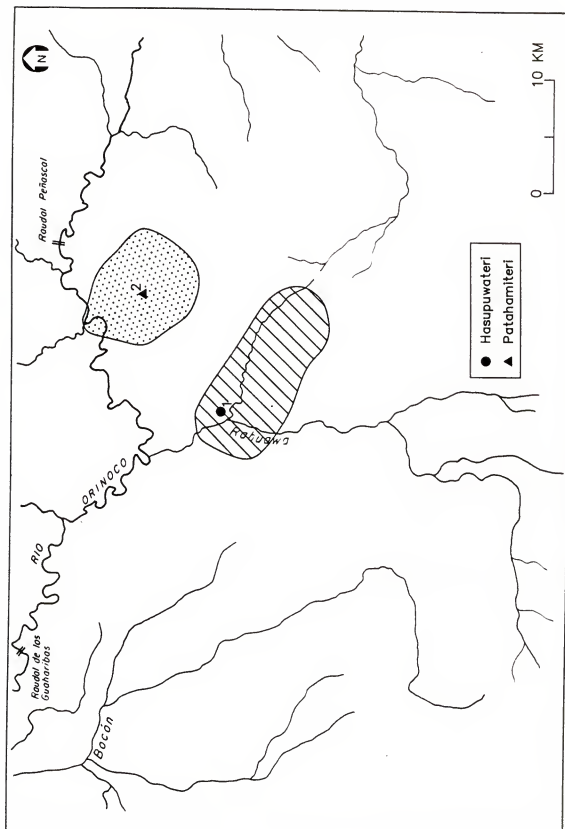


Figure 8. Home bases of Hasupiwetheri and Patahamitheri 1978.

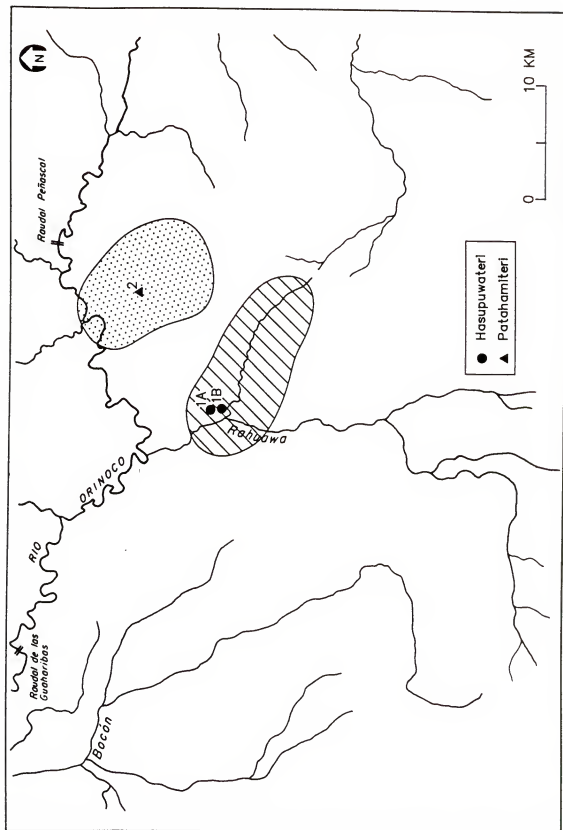


Figure 9. Home bases of Hasupiwetheri and Patahamiteri 1981.

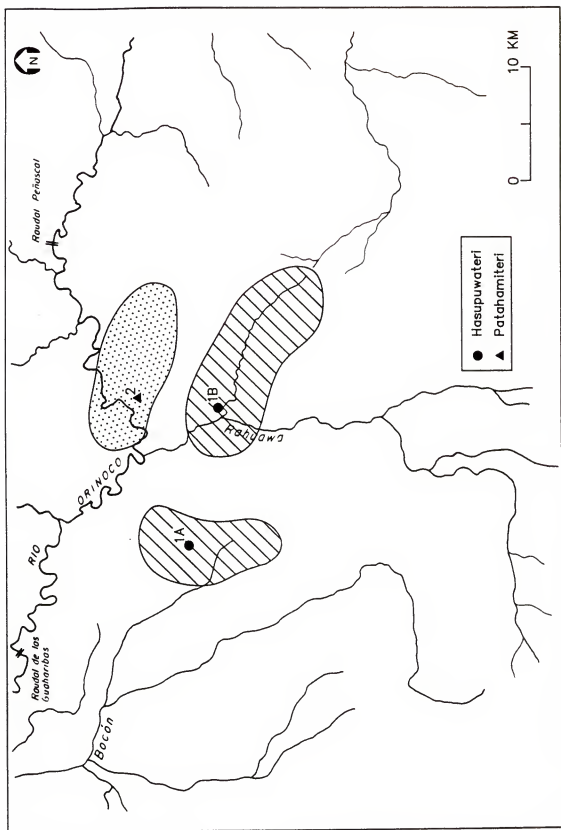


Figure 10. Home bases of Hasupiwet'eri and Patahamit'eri 1983.

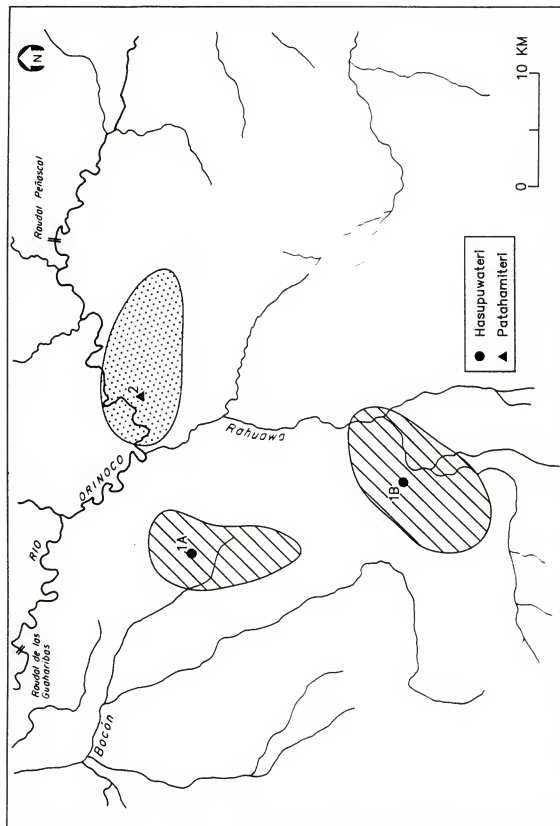


Figure 11. Home bases of Hasupiweteri and Patahamiteri 1985.

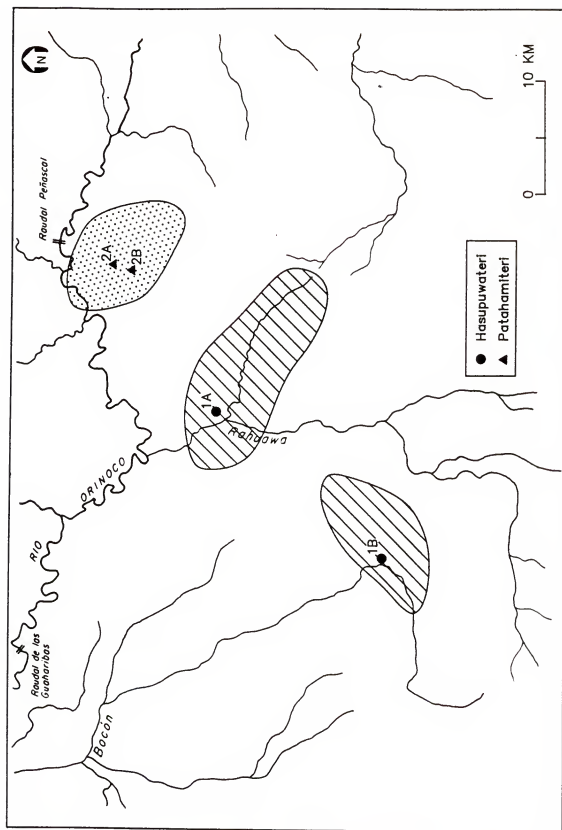


Figure 12. Home bases of Hasupiwet'eri and Patahamit'eri 1987.

impossible. For this same reason they never replant an old garden site.

Within the Orinoco-Siapa region during the period from 1976 to 1985, the average length of residence of 4 communities at each garden before relocating permanently to another was 22 months (table 4). During this period of residence a new garden was always under development, and the principal garden and communal house were periodically abandoned to live in provisional structures at this new site. Likewise, visits were made to an old garden which was still producing plantains and bananas.

#### Gathering

While both men and women participate in gathering activities, they are carried out primarily by women. The foods, animal and vegetable, acquired by women on their excursions in the forest represent their major contribution to the family diet.

Since women do not carry out garden activities and do not participate in hunts they are able to go out almost daily to gather fruits, nuts, and legumes in the forest. Over 70% of their total subsistence activities is dedicated to gathering (table 3), the largest quantity of time in one category for either men or women. In addition, during the dry season they do freshwater crabbing and catch fish with their hands. These creeks are no wider than 1 to 2 meters and often amount to only a trickle, making possible hand



search among the tree roots and other crevices. On an infrequent basis the women participate in group fish-drugging or dredging of small ponds and rivers, also with their hands.

Women tend to go out in the forest in groups more than do men. Most of the food gathered is found in large concentrations. Thus when it is located it is more profitable for the community if a number of women travel together. Gathering in groups also provides an opportunity for women to socialize which they do not always have in the shapono. If a woman travels alone she is likely to be approached sexually if she encounters a male or be suspected of having an affair by her husband.

Normally women leave in the early morning shortly after the men depart for a hunt and return at mid-afternoon. Usually they know where they will go and which foods are available, having discussed it the day before. During each outing in the forest both men and women take note of the different foods encountered. These locations are discussed in the shapono and plans are made to go out and exploit them. Adolescent and pre-adolescent girls accompany their mothers and sisters and carry and look after the infants and small children.

Rarely do women return empty-handed. This, in part, is because most often the foods available are known beforehand and in part because of the great variety of foodstuffs in

the forest. It is most often the food harvested by the women which provides the afternoon meal, the first food of the day which is not plantains. The importance of gathered foods for variety in the diet will be appreciated when hunting is discussed below.

### Fishing

Within traditional Yanomami culture fish are not a major source of protein. Since they live in interfluvial locales they have access only to the small streams where at best an irregular catch of small fish is possible.

Three principal fishing techniques are practiced. The most common method by women is to simply trap the fish with their hands in the holes and tree roots along the edges of the small streams.

A second form of fishing is with small bows and arrows similar to the ones the children use to play. This technique is practiced exclusively by the men. When the streams are low, the small fish are found in concentrations at the bends and become easy prey for a man skillful with a bow. This form of fishing is employed sporadically and only during the drier months of the year.

A third form of fishing involves the entire community and results in the largest catch. Various vines and tree barks are beaten and used to stupefy the fish so that they can be easily plucked from the water. This technique is employed very infrequently, once or twice a season and some

years not at all. Often, it is the shaman who decides when they shall drug fish, and it is he who directs the stripping of the bark and chants to assure the substance will be effective. While these materials are being prepared the other men, women and children make a dam out of rocks and logs, sealing off both ends of a section of the stream.

Within a half-hour of the first application of the pounded bark the fish begin to float to the surface where they are easily clubbed and snatched from the water. As many as 80 kilograms have been caught on a single outing. Because of this large quantity it is one of the few times when fish are smoked rather than roasted or boiled.

Those communities which have moved near the larger rivers now have access to fishline and hooks, and those living near the missions even acquire nets, canoes, and outboard motors. This has drastically changed the significance of fish in the diet of these acculturated communities and has a marked effect on the amount of time invested in hunting. It is important, however, that the technology be available for this to occur. But those communities which do not have access to hooks and line and do not know how to make canoes cannot benefit from living near the major rivers. When Poreyanimopit<sup>h</sup>eri lived near the Orinoco River they most often walked inland to fish in the small streams. This is because they had no canoes or heavy fishline and hooks.

### Hunting

Hunting is the only subsistence activity carried out exclusively by men. While women sometimes bring home a turtle or armadillo and frequently fish and crabs, the method of procurement is better described as gathering rather than hunting.

Yanomami hunting technology is relatively simple consisting merely of the bow and arrow. The bows measure about 6 feet in length and are made from two kinds of very hard palm wood: hoko (Jessenia bataua, from Lizot 1975) and rasha (Guilielma gasipaes). They are about as strong as most Western hunting bows with an average of 57 pound pull (the hoko have about a 60 pound pull and the rasha about 50 pounds, but more hoko are used than rasha). The arrows are made from cane (Gynerium sagittatum), which they grow in their gardens or find wild along the rivers. They are even longer than the bows, and although they appear rather awkward they serve the hunters well for both terrestrial and arboreal animals. The strings for the bows are made of the inner bark of a tree (Cecropia sp.) and rubbed down with a resin.

The one other item in the paraphernalia of the hunter is the arrow point quiver made from the section of a large bamboo. Unlike those of other Amazonian tribes, Yanomami arrow points with one exception are not permanently fixed to the arrow. Inside the quiver are kept a variety of arrow

points, an agouti tooth burin, resin, and possibly some magical plants. All of these items are used for fabricating and repairing arrows. The holder is slung over the back and attached around the neck with a bark string. Of the three kinds of arrow points the lanceolate palm wood (rahaka) is used most often for big game while a barbed bone point (u namo) is preferred for arboreal species such as monkeys and birds. They also possess a curare coated point (mamokori) which is used frequently for monkeys. Since the curare points require much more work to prepare as well as shamanistic assistance, they are used sparingly.

From as early as three years of age the little boys begin to play with miniature bows and arrows which their fathers make for them out of saplings and split reeds. Thus, they begin the life-long process of learning what will be their most important activity when they become men. The men encourage their sons to begin perfecting their abilities to stalk and dispatch animals of the forest. The smallest ones begin by shooting plantain peels. As they approach five or six years of age their prey will become small lizards that appear in the bush near the house. They learn to move with agility, waiting in absolute silence for the prey to expose itself, and finally to breathlessly draw the bow and release the arrow. As the boys grow older they will be allowed to accompany their fathers and gradually put their developing skills to practice. Despite the early

inception of training, it is not until they are well into adulthood that they become proficient at determining the behavior of the different animals and stalking and killing them.

#### Rami: Single-day Hunt

The most common form of hunt is one in which one or more adult men leave at the break of dawn or even before and return mid to late afternoon. Usually at least one dog is taken along to aid in locating and sometimes trapping the prey.

An adult male participates in a rami hunt an average of about twice a week. As I stated earlier, those who hunt infrequently are either individuals who are not very successful or they are elderly and the more important men of the village.

The areas covered on the rami hunt are limited to those from which hunters can return before nightfall. The average duration of the rami is about 6 hours (see chapter 3). Generally, this one-day radius of hunting areas becomes very familiar to the hunter over time and rarely does he misjudge the time necessary to return home before dark. Should a hunter not return by dark his village mates become quite concerned and sometimes send scouts to try to locate him.

The Yanomami do not hunt at night except for short pre-dawn hunts in the immediate vicinity of the village (see discussion below). They do not have any means of

illuminating the trails so hunting numerous nocturnal species is extremely difficult. This greatly reduces the options for acquiring certain animals, ones which many other tribes and acculturated Yanomami are able to exploit. In addition, without lights poisonous snakes are a hazard and they are reluctant to walk the trails at night.

When a hunter embarks on a hunt his principal objective is to bring home as much meat as he can. Although his greatest delight would be to dispatch a large animal such as a peccary or tapir he actively pursues almost all species. Therefore, from the moment he leaves the village until he returns his senses are alert for any game animal. His preference for a larger animal is influenced by the fact that, in addition to the great amount of meat acquired in a single killing, he will be able to make a village-wide distribution. The significance of intravillage distributions will be discussed below.

#### Rami hunting strategies

Before the hunter leaves the village he has planned well exactly which itinerary he will take for his hunt. The men discuss in the evening where they might go hunting the next day. Different areas are evaluated, usually referred to by the creeks, the most common markers of the forest. Any evidence of animal tracks observed by the men and women on previous treks through the forest is exchanged. On the rare occasion when white-lipped peccary tracks are sighted the

headman addresses the entire village (kauamou) the night before the hunt, instructing the men to prepare to hunt at sunrise (see Good, 1988b).

In the morning the hunter rises early and quickly prepares his bow and arrows and checks his quiver for extra arrow points. He knows that if he should be so fortunate to encounter a peccary or tapir he will need a good quality rahaka point to kill it. He also keeps an arrow prepared with a bone point for most other animals.

Frequently the hunter goes with his sister's husband because they have developed a close cooperative relationship through marriage. All game will be shared even if only one person does the killing. Normally it is the hunting partner who carries and cooks and distributes in the village any large animal killed.

The hunter leaves on one of the 3 or 4 trails leading from the shapono. His plans are usually to cover a great distance, and if he is fortunate, he will carry home on his back that food which is the most desired of all those found in the forest. As he walks quietly down the trails his eyes move in all directions from left to right, up towards the tree tops and down on the ground. After traveling about 1/2 hour to an hour along this trail he leaves it and begins to hunt through the untraveled forest. Normally after making this transverse walk he comes back to the original trail at a point closer to the shapono and returns home from there.



Oftentimes the hunter follows one of the numerous small creeks which form a network in the lowland areas. He walks upstream through the waters where many of the larger species of birds are frequently sighted. Later he will relate to his village mates the itinerary of his journey in terms of this creek.

Although the Yanomami have a very simple technology they nevertheless are knowledgeable of the habits of the various animals and develop keen ability to discern where the prey may be located. Tracks are interpreted by age and direction. Droppings of arboreal animals on the leaves, or of the fruits they eat alert the hunter of the presence of game animals.

As he moves along the trails, even though he walks with great stealth and the keenest of observation, he periodically flushes birds and other animals from their resting spots. A hunter never shoots at a bird once it is in flight, so on these occasions he can do nothing more than observe its escape in frustration.

On other occasions the hunter is able to detect a bird and quietly move in close for a shot. Even in these instances when a bird is approached there are other difficulties such as height in tree, obstacle to line of fire, etc. Despite a life time of practice, the careful manufacture of bows and arrows, the numberless hours in the

forest in search of game, the chances of killing an animal are quite limited.

Since many Amazonian animals are solitary or travel in pairs the Yanomami have developed few hunting strategies which require a concerted effort of a group of hunters. The one major exception is the white-lipped peccary which is most often encountered on the multi-day hunting trip to be discussed below. On occasion, when there is a large flock of trumpeter birds (Psophia crepitans) one man will flush them towards a spot where several other hunters are waiting. However, the method is quite unpredictable and of the 28 times I observed this technique 17 or 61% of the time the birds flew away from the hunters.

The hunters almost always take a dog along because they are useful for locating game and alerting the hunter. In general, dogs are kept as pets, but their value is determined principally by their efficiency in the hunt. When a dog flushes an animal or aids in any way in dispatching it the hunters always assert upon their return to the shapono that it was the dog that killed it. A good hunting-dog is highly valued, and its death is taken as a great loss. It is cremated and mourned in a manner similar to that of a human death, although the ashes are not drunk. The dog's name, as in the case of all Yanomami, becomes unmentionable, and a slip of the tongue causes great pain and even anger in the former owner.

Because of the great value placed on them, hunting dogs are the principal object of exchange in an elaborate region-wide trading network which extends from north of the Orinoco River to the Shamath<sup>h</sup>ari communities located to the south near the Brazilian border (see figure 3). The Shamath<sup>h</sup>ari have acquired a reputation as good dog breeders, and their dogs are traded north via intermediaries to villages which have access to steel tools from the missionaries. These tools, as well as aluminum pots, have become the standard items of exchange for a hunting dog (Good 1988a). Other more costly items such as shotguns and factory-made cotton hammocks are only obtained by the very few Yanomami who live near the missions.

When a hunter kills a large animal he usually eviscerates it and returns to the village, terminating the hunt regardless of the hour. If it is a small animal he will continue hunting if it is still early morning. However, if it is about noon or later he quits hunting and turns back.

Undoubtedly the proudest moment in a Yanomami man's life is when he is able to suddenly appear through an opening in the shapono with an animal hanging on his back. As the children yelp and others comment, he marches quickly to his hammock, drops the carcass on the ground and reclines in his hammock with his hand over his mouth and speaks to and looks at no one. He stays in his hammock and feels great pride as

his catch is inspected and admired by the village. If the animal is large, relatives gather around and heap praise and appreciation. Large animals are not seen in the village with great frequency. Although each person will normally receive only a few ounces, if any at all, they are always excited when such animals are brought home.

Yaikou (pre-dawn hunt).

The yaikou hunt is carried out in pre-dawn darkness mostly by the younger men. Normally three or four or even more hunters using a few embers from the family fire leave the shapono in search of roosting birds and other animals. Usually they do not go far and return at daybreak or an hour or so later. The success rate of the yaikou hunt is less than 20%, the least of all forms of hunting. This is in part due to the difficult nature of nighttime hunting and in part because it lasts only a couple of hours and is carried out in the immediate vicinity of the village, frequently near the gardens.<sup>1</sup> The vast majority of the kills on the yaikou are birds. Only rarely are other animals killed.

Weyai (dusk hunt)

This hunt is similar to the yaikou except that it is carried out the last hour before dusk in the immediate environs of the village. It is just at nightfall when the hashimo (*Tinamus* sp.) and pokorami (*odonto phorus*) have already roosted for the night.<sup>2</sup> As in the yaikou this hunt

is most often carried out by the young men, especially those who have been betrothed a young girl.

Heniyomou (multiple-day communal hunt)

The other major form of hunting is the multiple-day group hunt or heniyomou. In this hunt almost all of the adult men and a number of adolescents camp out in the forest for 4 to 6 days spending all of the daylight hours in search of game. Plantains are brought along for food, and provisional shelters are made for protection against rain.

The major objective of many heniyomou hunts is to procure large quantities of game for a funeral feast. During such a feast the lineage of the deceased person presents large baskets of boiled plantains and meat to another lineage, either from within the community or from a neighboring community, which participates in the ceremonies. Therefore, on the heniyomou, more than any other time, capture of large game is the prime goal. Of all the large game the most preferred and the most commonly killed are the white-lipped peccary. Nevertheless, any game is acceptable and the hunters are contented to return with a large quantity of meat of any kind. Despite the great distance traveled, the relatively unexploited areas which are reached, and the large number of participants intensively hunting the forest, the success rate is rather modest. By failure, it is meant that there was not a sufficient amount to enable a distribution (see chapter 3). In addition to

providing meat for funerary feast purposes, the heniyomou also serves the purpose of simply acquiring meat for the community. Particularly when several weeks have passed with little success on the rami hunts, the people begin to crave meat and a heniyomou is agreed upon.

When such a hunt is planned the participants begin discussing it the night before and check their bows and arrows to make sure they are in good order. In the morning the men rise early, make final adjustments and tie up a bunch of plantains which will serve as their only food for the next 5 or 6 days, unless some easily accessible fruits or nuts are encountered in the forest. Although the meat is smoked while on the heniyomou, only some of the internal organs are eaten. The rest is saved for the village distribution. Some men take along a vine hammock (t<sup>h</sup>oo t<sup>h</sup>oku) while others decide to make one in the forest from the bark of a particular tree (nari nat<sup>h</sup>i).

As they prepare their things to leave, others encourage them to do well. They abruptly stand and march from the village looking and speaking to no one. The hunt is at the same time the most honorable event and the most critical for Yanomami subsistence. For days they have had a diet consisting predominantly of plantains with small amounts of other foods. The people have spoken of their desire for meat and how their children grow strong from drinking the broth. On this day the participants have decided to try

their luck at meeting this need. They know that their women and children will be waiting for them. They know that the men who provided meat for them last week or last month will be pleased with their catch and that they will have the opportunity to swing in their hammocks as their catch is distributed about the village with a sense of fulfillment of their responsibilities as husbands, fathers, and community members.

Once the plantains and hammocks are packed the hunters begin to march briskly from the village, rarely speaking to anyone. The dogs are carried out of the house and down the trail as on the rami. This is done because the dogs frequently refuse to follow the hunters or turn back if let loose near the house. Later on they will be of great use for flushing out game and sometimes trapping animals until the hunter is able to shoot them.

For the first hour or so the hunters move briskly down the trail. They wish to get a certain distance from the village into areas less frequented. They are always on the look out for game, however, from the moment they leave the shapono. In the late morning or early afternoon they stop to make camp. Everyone joins in making the provisional shelter as quickly as possible so that the rest of the daylight hours can be spent on hunting. The young boys who accompany their fathers and older brothers are useful for relieving the hunters of these chores. They gather leaves

for the roof and bring back firewood for the night. The hunters soon disappear into the forest to get a good start on hunting.

Although the entire group might amount to 15 to 20 men, they go off in smaller groups of 2 or 3 in different directions. The hunters believe that larger groups would alarm the animals and are impractical and inefficient for maximizing exploitation of the area. This is particularly true in that they will spend only one night there and move on in the morning.

The one exception to the individual hunting is when a herd of white-lipped peccaries are discovered in the vicinity. When a hunter comes across such a herd his first thought is to advise the others, for this is the single situation in Yanomami hunting which requires a group of men to maximize the kill.

The Yanomami have a very effective means of calling to each other in the forest. However, in the situation of encountering a herd of peccary the notification must be done with total care lest the herd be prematurely scared off. If a younger person is accompanying the hunter he will be sent running back to the camp to call any hunters who may be taking a break. Others are met in the forest.

When a group of at least 4 or 5 hunters is assembled the strategy is planned. One hunter is sent around the herd to drive it towards the other hunters. He must be careful, for



if he alarms the animals before he gets his position they will run in the opposite direction. A young inexperienced hunter would not be given this task. If the hunters are fortunate, the herd will come stampeding towards the waiting group. When this occurs the greatest moments of excitement in Yanomami hunting ensues. As the herd of as many as 50 or more peccaries stampedes, the hunters dash about yelling and shooting at the leaders of the herd. Some scurry to trap or shoot the young peccaries unable to keep up with the others. Frequently, a peccary is shot and keeps running. The hunter pursues it and may not return for hours. It is not until nightfall that all the hunters are back at the camp.

On successful hunting days, especially when large game has been killed, the evening is a pleasant one spent smoking the meat over log racks built above a large fire. The meat must be cured as it will be a day or so before it will be distributed in the village and eaten. Storage of meat as well as any other food for the Yanomami is virtually impossible. Even the heavily smoked meat in the tropics lasts for only a few days before it spoils and becomes filled with maggots. The fact that the portions distributed to each person are small make it unlikely that any would be left of their share after two days. In most cases all of the meat is eaten the same day that it is distributed.

The length of the heniyomou depends on the hunting success of the initial days. If much game is killed the

first day the hunters will return to the village the following morning. This occurs very rarely, however, and was recorded only 4 times in 121 heniyomou hunts from 1975 to 1988. Most often it is not until the Yanomami get to the second or third campsite that they begin to sight and dispatch game in any quantity. The first campsite is normally within range of the single-day rami hunts. By the second and certainly the third campsite the hunters have moved into areas of the forest hunted only on the heniyomou. The hunting yields at these successive sites get increasingly higher. Normally the heniyomou lasts five days, but some, on occasions when the hunt is not very successful, are extended to 6 days or even more.

When it is time for the hunters to return home they rise early in the morning and begin preparing the packages of smoked meat to carry back to the communal house. A number of broad leaves are arranged on the ground and the meat placed on top of them. With other leaves they tie together a bundle using vines pulled from a nearby tree. The package is then carried home using the inner bark of a suitable tree as a tumpline. The weight is shared by everyone, but all the meat will be assembled and distributed by one lineage to another during the funeral ceremonies.

The hunters walk quickly and while it may require 2 to 4 days to arrive at the most distant campsite, it may take only 6 to 10 hours to return home.

When they arrive they march directly to their section of the communal house, drop their package, and recline in their hammocks. As always, they frequently cover their mouths with their hands and do not speak to anyone. Normally, their trip home is long and arduous. They arrive tired and hungry and if their wives are home they are immediately offered food. If the heniyomou has been successful, the hunters are greeted with shouts of joy by the children who chant, "waré kēki, waré kēki", peccaries, peccaries!. The adult men who did not go on the hunt inspect the packages. Later the hunters will relate every phase of the almost week-long event. All animals that were spotted are mentioned. Graphic descriptions of each encounter are related: how a certain animal escaped, often with an arrow stuck in it, how another bolted away just before the hunter was to release his drawn bowstring. The others listen and respond as each phrase with delight or shared frustration. Truly, it is a great moment for a hunter when he makes a direct hit on a peccary or tapir. The women listen as they unpack the catch. The young boys are attentive to each remark, of the successes and the failures. They someday will be required to carry out the critical duty of providing meat to their fellow villagers. Some will enter into son-in-law relationship which will entail primarily hunting for their parents-in-law.<sup>3</sup>

### Trekking

Anytime Yanomami men are in the forest, they are hunting. That is, they are on the lookout at all times for game animals. Even after carrying out a raid on another village they often take extra time to hunt on their trip home.

There is one other context, however, still to be described in which the men engage in hunting. This is the wayumi community trek. On these occasions the entire village abandons the shapono and sets off into the forest. The Yanomami trek differs from that of many other tribes which usually leave people behind to care for the house (Wagley 1977:52-53; Werner 1983:226-227). All possessions are packed and carried, for anything left behind could be stolen by others who might visit in their absence. The men move ahead of the rest carrying only their bows and arrows so that they can shoot any animals they might encounter. The women carry large packs with all the family possessions, as well as the very small children. Therefore, the group moves very slowly and stops frequently to rest along the trail.

The purpose of the wayumi is to arrive at a place in the forest where there is a concentration of food. Normally, the community sets out when the gardens have become exhausted of plantains ready to harvest. Most of the treks last 3 to 6 weeks, so by the time they return home there are some

plantains which are ready to eat. Since plantains provide the bulk of the food while living at the garden sites, their availability is critical, and when they are depleted the community must look for food in the forest.

Nevertheless, there are other motivations for initiating a wayumi. There are certain times when a community wishes to set out in the forest even though there are still harvestable plantains in the garden. Most often the cause is an intravillage dispute. In these instances the 2 or 3 sub-lineages set out on wayumi in different directions. Thus, they are able to separate themselves for a number of weeks and come together again when tensions have subsided.

Another reason for wishing to trek in the forest is the desire to exploit a large concentration of fruits or other foods which they know are presently available. By removing the entire community to the site where the foods are located the added work of transporting small amounts to the communal house on a daily basis is avoided. Sometimes the food is located in an area which is too far away to carry back to the village in a single day. The entire group then spends up to 5 or 6 days to arrive at the spot. There they make provisional shelters and camp out until the food is exhausted.

Lastly, an additional reason for initiating a wayumi is the expressed desire to hunt in a specific part of the forest which they believe to be active with game. This is

particularly true when a number of one-day rami hunts have failed. The men begin to think and talk of more distant areas, ones which normally go unexploited. As will be discussed below, the hunting yields on wayumi treks are significantly higher than those at the home site. In the afternoon, particularly after a shamanistic chanting session, the men sit about and discuss the likelihood of game being present in a certain area. Others mention how they are meat-hungry (naiki) and how long it has been since they have had a good piece of meat. As sentiments mount a consensus is reached to go on the wayumi. A direction is decided upon and the headman announces to the village that they will pack up and leave (hokei). Frequently a community will have an area where they return every 6 months or year. In these cases the men will actually clear and plant a small garden so they will have plantains to eat with the meat when they camp there. With the introduction of fishhooks and line some groups now camp out near the rivers to fish for a number of days. Also at these riverine sites it is common for them to make a small garden so that they will have plantains to accompany the fish.

When traveling on a wayumi trek the group stops in the early afternoon to make camp. Since the children and elderly people cannot travel long distances, the group does not try to cover a great deal of ground in a day. As soon as the group stops, everyone immediately begins to clear the

site and gather materials for the provisional shelter (yano or hatho nahi). Since it takes only an hour for two people to erect a yano it is of little consequence to have to make a new one each night as the group moves through the forest. The structure consists of 6 saplings and a dozen or so cross bars on the roof to support the platanillo leaves which are simply laid on the sticks and weighted down with other branches quickly cut from the closest tree. The communal shapono on the other hand is much more elaborate with woven leaf roof as high as 30 feet off the ground, all done to last for at least two years and as many as five. The most time consuming part of constructing the provisional yano is the gathering of leaves for the roof. Frequently the women will carry these leaves on to the next campsite to avoid spending time getting new ones.

As soon as the man has cut poles and erected the frame of the structure he sets off into the forest to hunt, leaving his wife to finish the roof. The major attraction of moving to a new area of the forest is that it has not been hunted for many months and the hunter firmly believes that game must be present in abundance. This is another reason why they make camp early in the afternoon, to allow some daylight hours to hunt the area before moving on in the morning.

Normally, the group spends only one night at each site for the first week or so. Finally, when the desired area is

reached the campsite is made with a little more care, for they will be there for as long as 2 weeks. The individual shelters are constructed in a pattern more closely approximating a circle. More ground area is cleared of undergrowth and larger stacks of firewood are accumulated by the women.

The men also engage in more intensive hunting at the principal wayumi camp. While the women are gathering foods the men set off early in the morning to hunt the new area. They return earlier in the day than they normally do at the garden site both because they do not have to travel far, and secondly, because the area is less familiar to them and they therefore, like to get back well before dark. Once the principal wayumi site is established the men sometimes initiate a multiple-day heniyomou hunt. This takes them into even more remote areas than the wayumi camp.

#### NOTES

1. Although the yaikou hunts frequently take place in and around the gardens, very few animals are killed in the gardens. The animal that is frequently attracted to the garden clearing is the brocket deer (Mazama nemoriaga), which is extremely elusive and undesirable for meat for the Yanomami. Instead, yaikou hunts take place in the primary forest near the shapono with roosting birds as the principal prey.
2. Hames (1982:372) incorrectly states that pokorami, a Yanomami name, is a Ye'kwana term.
3. This is not to be confused with bride service, a term appropriate for some other societies but not for the Yanomami. The Yanomami term for a young man who has entered into a betrothal relationship is siyohamou which derives from siyoha, son-in-law and the action suffix mou which indicates "the activity of". Thus, when a man acts as a



son-in-law he has accepted the girl (as she has accepted him), and he begins to act as a "married" man, that is, as a son-in-law. Likewise the girl's parents begin to treat him as a son-in-law. They give him food, tobacco, firewood, hammocks, etc. Of course if he kills an animal or collects some fruit he is expected to share them with his parents-in-law. In no way is this considered a "service". In fact, the young man, especially if he is from a different village, receives more than he contributes.

### CHAPTER 3 VARIATIONS IN HUNTING PRODUCTIVITY

#### Residence Cycles

From the preceding discussion of subsistence activities it can be seen that a community resides at a number of different areas throughout an extensive region over the course of a yearly round. In figure 13, the extent of the different areas for Hasupiwēt<sup>h</sup>eri can be compared. Table 5, shows the number of days spent per year by two communities (Hasupiwēt<sup>h</sup>eri and Patahamit<sup>h</sup>eri) at various sites from 1975 to 1981. While the home base, which consists of the shapono and the adjacent gardens, is the base for community activities, in both villages it was occupied only a little more than half of the time.

During 21% of the year the Hasupiwēt<sup>h</sup>eri lived in provisional shelters at the new garden site which they were preparing at Wawatoi. During this time the only contact with the shapono at the home base (area A) was to return to harvest bananas and plantains to eat while working on the new garden.

Hunting yields at the various locales suggest that game productivity is an important factor in village relocations.

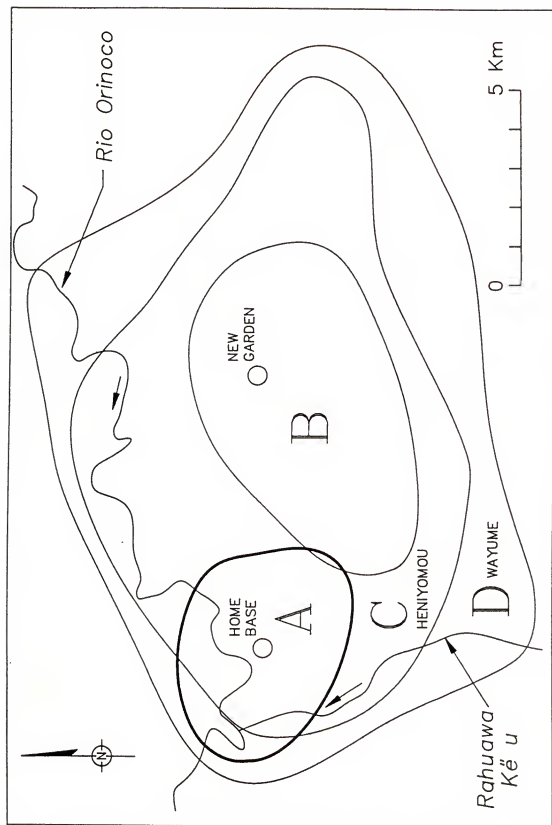


Figure 13. Hunting areas of Hasupiwetheri 1976.

Table 5. Residence time in the sub-areas occupied in the course of the yearly round for two villages. Based on 658 days of observation of the Hasupiwet<sup>h</sup>eri and 382 days of the Patahamit<sup>h</sup>eri from 1975 to 1981.

Area <sup>a</sup>	Hasupiwet <sup>h</sup> eri		Patahamit <sup>h</sup> eri	
	no. of days	(%)	no. of days	(%)
Home base (area A)	354	53.8	225	58.8
New garden (area B)	136	20.7	0	0
<u>Wayumi</u> (area C)	168	25.5	157	41.2
TOTALS	658	100.0	382	100.0

<sup>a</sup>See figure 13 for designated areas.

Table 6. Time spent hunting in the different forest regions.

Region <sup>a</sup>	Hasupiwët <sup>heri</sup>		Patahamit <sup>heri</sup>	
	no. of days	(%)	no. of days	(%)
Home base	316	48.0	189	49.5
New garden	118	17.9	0	0
<u>Wayumi</u> trek	151	22.9	141	36.9
<u>Heniyomou</u>	73	11.1	52	13.6
TOTALS	658	99.9	382	100.0

<sup>a</sup>see figure 13 for hunting regions.

This productivity and its relationships with other community activities will be the focus of this chapter.

### Wayumi Treks

During the 382 days that I made direct observation of the Patahamit<sup>h</sup>eri they did not begin a new garden but lived off the products of the gardens at their home base where the shapono was located (Poreyanimopi) and their old garden at Patahami.

The lack of new garden activity by the Patahamit<sup>h</sup>eri becomes significant when we look at the time spent on wayumi treks. Forty-one per cent of their time was spent on wayumi compared to 25% for Hasupiwët<sup>h</sup>eri, or about 16% more. Both villages were absent from the shapono and adjacent gardens for almost half of the time (46% for Hasupiwët<sup>h</sup>eri and 41% for Patahamit<sup>h</sup>eri). As mentioned above, because in most cases when they leave for the forest they have already run out of bananas and plantains, it would seem that there is a relationship between crop exhaustion and wayumi treks. It is quite possible that when the men plant their gardens they do so at a rate which takes into consideration these trips. Another possibility is that they do not intentionally plant less than is required to have an adequate supply of plantains for continuous consumption, but rather the sequence of maturation is such that there are intermittent periods when no mature crops are available. I will examine these possibilities in the next chapter.

While they are at the new garden, the community continues to eat plantains brought from their old gardens and also a few from the new garden when they begin to mature. However, they eat fewer plantains during this time than they do while residing at the shapono since transporting them from the old gardens is more difficult, and there are normally very few available. Therefore, more reliance is placed on foods harvested from the forest as is done on the wayumi (table 7). This is so not only because there are fewer plantains to eat, but also because these wild foods are normally in greater abundance and more accessible than when living at the home base. There is a definite correlation between the time a community chooses to engage in these activities and the availability of wild foods. For this reason, as mentioned above, there is no clear season for gardening activities. Rather gardening is done throughout the year and often burning is done in between rains except during times of the heaviest precipitation, approximately in August.

A major effect of shifts in residence is that the hunters are able to exploit a much more extensive area than would be feasible from a stationary village site. By regularly establishing new gardens at a distance from the shapono and by sleeping 4 to 5 nights in the forest on the heniyomou and by going on wayumi treks the men are able to hunt a large region which would be beyond the reach of the

Table 7. Total vegetable foods consumed by a village of 67 people (Wawatoit<sup>h</sup>eri) at different residence sites.

	Home base <sup>a</sup>		New Garden <sup>b</sup>		<u>Wayumi</u> <sup>c</sup>	
	kg.	% wt.	kg.	% wt.	kg.	% wt.
Garden crops	6226	89.8	2294	62.5	1336	34.0
Gathering	716	10.3	1358	37.5	2594	66.0
Totals	6942	100.1	3651	100.0	4930	100.0

<sup>a</sup> 66 days from field periods 15, 17, 18, 19, 20, 27.

<sup>b</sup> 45 days from field periods 23, 25, 28.

<sup>c</sup> 50 days from field periods 21, 24, 26.



one-day rami hunts initiated from the base village (figure 13).

In order to determine the direct results of residence in different forest areas on meat consumption I recorded hunting production at each locale. Consumption/production on each type of hunt will be discussed separately.

#### Rami Hunts

Table 8, provides the hunting yields of one-day rami hunts from the home base, new garden sites, and wayumi treks. As mentioned earlier, during the clearing and development of the new garden site the community moves back and forth between it and the home base for periods of 1 to 3 months, the period increasing at the new garden as it begins to produce which generally does not take place until about a year after the initial plantings. After the garden begins to produce they build a shapono and abandon their provisional shelters. It is at this point that the new garden becomes the home base and the previous home base becomes the old garden. Since, as I mentioned earlier, a community moves approximately every 2 years, data in table 8, represent several sites over an 8-year period for each category. The home base data pertain to Hashaawa, Poreyanimopi, Iro Kai, and Wawatoi gardens. "New garden" data pertain to gardens before they became home bases. Hunting productivity was recorded for each phase of the occupation at each site. Finally, rami hunts carried out

Table 8. Yields for rami hunts of the Hasupiwet<sup>h</sup>eri at the home base, new garden, and wayumi treks. Data is derived from 1857 hunts from 1975 to 1983. Mean population: 108.

	Home base <sup>a</sup>	New garden <sup>b</sup>		<u>Wayumi</u> <sup>c</sup>
		year 1 <sup>d</sup>	year 2 <sup>e</sup>	
No. of hunts	523	348	474	512
No. of hunters/day	7.20	6.10	6.90	8.60
No. of hours/hunt	6.51	6.38	6.55	5.84
Dressed game per hunt (kg.)	1.62	2.83	2.04	2.64
Dressed game per hunter-hour (kg.) <sup>f</sup>	0.25	0.44	0.31	0.45
Dressed game per capita per day(kg.)	0.11	0.16	0.13	0.21
Meat/capita/day (kg.)	0.09	0.13	0.10	0.17
Protein (gm) per capita/day	17.28	25.57	20.85	33.64
Success rates (%)	40.93	47.25	42.20	52.60

<sup>a</sup>from field periods 1, 2, 6, 9, 18, 19, 20.

<sup>b</sup>from field periods 1, 3, 7, 11, 12, 23.

<sup>c</sup>from field periods 1, 4, 10, 15.

<sup>d</sup>first 3 months of clearing the new garden.

<sup>e</sup>first 3 months after construction of the shapono.

<sup>f</sup>all hunts, successful and unsuccessful, were included for the calculation of productivity. The calculations of my previous article (1987, table 16.1) included only the successful hunts. The percentage of these are indicated on the bottom line of that table. While these rates indicate the average quantity of meat procured on a rami hunt when there was one or more kills, the rates in this table indicate overall productivity for all hunts regardless of the outcome.

while on 3 wayumi treks were documented for comparison with rami hunts from the new garden and home base sites.

Significance tests were done on a set of data from January to October 1976. During the 514 hunts of the data set 1 tapir was killed at the home base. Because it weighed 220 kg. and the next closest kill weighed 40 kg, it was excluded from this analysis. I believe this is justified since tapir kills are very rare (1-2 per year) and the meat is consumed in 1 or 2 days . It therefore, does not affect the rythm of consumption. It does, however, affect the overall averages of per capita daily consumption. It was also excluded from table 7.

During the initial months of clearing a new garden site, the per hunt yields increased by 75% over the home base (1.62 kg./hunt to 2.83 kg./hunt). Even more important, however, is the decline in yields at the beginning of the second year of the garden's existence, (2.83 kg./hunt to 2.04 kg./hunt) a decrease of 28% in just one year. Actually the yields per hunter-hour level off in this year to almost the same as those at the home base (which at this point becomes the "old garden")

Although the yields (dressed game/hunt) of rami hunts carried out from a wayumi camp were lower than those from the first three months residence at a new garden, they were still higher than home base yields and higher than the average of the second year at the new garden (2.64 kg. to

2.37 kg at the new garden) In the 1976 data (table 9) there was a 53% increase on the wayumi from the home base (Prob >Z.0794). When we look at the productivity per hunter-hour, however, the first year new garden and the wayumi are about the same. The most likely explanation for this is that animals are encountered earlier and closer to the wayumi camp than at the home base. This enables the hunters to spend less time hunting than at other sites and to return earlier to camp, which has the added benefit of not requiring them to venture far into unfamiliar territory. In addition, yields per hunter-hour are higher on rami hunts during wayumi because large game are killed more often on wayumi hunts than on home base rami hunts (24.4% on wayumi to 18.2% at the home base, see table 10).

In addition to the variations in hunting yields at the home base, new garden, and wayumi trek, yields at the home base varied by village size. Table 11, shows the hunting yields for 4 communities while residing at their home bases. The average size of Yanomami communities in the Orinoco-Siapa region in 1983 was 72 (table 12), so the first group of 42 is a small community which fissioned from a larger group of 91 persons. While there is a general trend towards lower per capita yields as a village grows larger there is more correlation between the two smaller and two larger villages. That is, when a village grows larger than the average-size Yanomami community (approximately 68

Table 9. Yields for rami hunts of the Hasupiwèth<sup>h</sup>eri at the home base, new garden and wayumi treks. Data is derived from 514 hunts from January to October 1976.

Category	Home base	New garden	<u>Wayumi</u>	Test $H_0$ $M_1=M_2=M_3$	Test $H_0$ $M_1=M_3$
No. hunts	278	107	129		
No. of days	42	19	18		
Ave. popu- lation	96.79	97.61	82	Prob>F.0001 <sup>a</sup>	Prob>Z.5305
Hunters/day	6.47	5.63	7.16	Prob>F.2466	Prob>Z.5305
Hunters/capita per day	.066	.057	.087	Prob>F.0127	Prob>T.031 (approx.)
Hours/hunt	7.78	6.67	6.25	Prob>F.0001	Prob>T.0001
Dressed game per hunt(kg)	1.81	2.52	2.76	Prob> $\chi^2$ .1831	Prob>Z.0794
Dressed game per hunter-hr.	.22	.39	.42	Prob> $\chi^2$ .0914	Prob>Z.0371
Dressed game per capita/day	.12	.14	.24	Prob> $\chi^2$ .1369	Prob>Z.0488
Meat per capita per day(kg)	.09	.11	.19	Prob> $\chi^2$ .1369	Prob>Z.0488
Protein/capita per day(gm)	19.51	23.39	38.66	Prob> $\chi^2$ .1369	Prob>Z.0488
Success rate <sup>b</sup>	36.33	38.32	44.19	$\chi^2$ Prob.317	$\chi^2$ Prob.13

<sup>a</sup>Due to hunt failures, variables calculated with yields are not normally distributed. Anova and t-tests were used for hunters/day and hours/hunt while Kruskal-Wallis was used to test all non-normal data (data using yields). Tests of significance of the variable success was calculated with  $\chi^2$  due to its binary distribution.

<sup>b</sup>Success is defined as any hunt with a kill.

Table 10. Per cent of game killed by frequency and size on home base rami hunts, wayumi treks and heniyomou hunts. Data were recorded from 1116 hunts from 1975 to 1981.

Size	Home base <sup>a</sup>		<u>Wayumi</u> <sup>b</sup>		<u>Heniyomou</u> <sup>c</sup>	
	total		total		total	
	%	wt. %	%	wt. %	%	wt. %
large <sup>d</sup>	18.2	36.6	24.4	44.2	28.3	61.9
small	81.8	43.4	75.6	55.8	71.7	38.1

<sup>a</sup>n=722 rami hunts or 4801 hunter-hours from field periods 2, 6, 9, 15, 17, 18, 19, 20.

<sup>b</sup>n=377 rami hunts or 2180 hunter-hours from field periods 4, 10, 15, 16.

<sup>c</sup>n=17 heniyomou hunts or 15,606 hunter-hours from field periods 6, 9, 11, 12, 15, 18, 26.

<sup>d</sup>all animals over 10 kilograms (dressed weight).

Table 11. Yields and frequencies of rami (one-day) hunts from the home base of four villages.

Village Size	42 <sup>a</sup>	67 <sup>b</sup>	92 <sup>c</sup>	127 <sup>d</sup>
No. of hunts	326	485	323	246
No. of hunters/day	3.88	4.80	6.59	8.78
Total dressed game/day (kg.)	7.28	10.95	10.25	12.80
Dressed game/hunter (kg.)	1.88	2.28	1.56	1.46
No. of hours/hunt	6.65	6.79	6.60	7.10
Dressed game/hunter-hour (kg.)	0.28	0.34	0.24	0.21
Dressed game/capita/day (kg.)	0.17	0.16	0.11	0.10
Meat/capita/day (kg.)	0.14	0.13	0.09	0.08
Protein/capita/day (gms.)	27.73	26.15	17.83	16.13

<sup>a</sup>from field periods 17, 18, 19.

<sup>b</sup>from field periods 19, 20, 21, 27.

<sup>c</sup>from field period 15.

<sup>d</sup>from field periods 29, 30, 31.

Table 12. Population change in communities of the Orinoco-Siapa region.

Village	1976	1983
1a. Hasupiwët <sup>h</sup> eri		62
1b. Poreyanimopit <sup>h</sup> eri	123	35
2. Patahamit <sup>h</sup> eri	83	90
3a. Kopariwët <sup>h</sup> eri		56
3b. Ashitowët <sup>h</sup> eri	132	41
3c. Kraiwët <sup>h</sup> eri		33
4a. Hiomisit <sup>h</sup> eri		123
4b. Pakawanipiwët <sup>h</sup> eri	153	38
5. Shinamayowët <sup>h</sup> eri	33	41
6. Hawarowët <sup>h</sup> eri	121	128
7. Masiripiwët <sup>h</sup> eri	87	104
8. Moyenapiwët <sup>h</sup> eri	91	90
9. Unamowët <sup>h</sup> eri	44	51
10a. Wapurawët <sup>h</sup> eri		75
10b. Nanimapiwët <sup>h</sup> eri	155	105
11. Yehiopit <sup>h</sup> eri	69	86
TOTALS	1091	1158
AVERAGE VILLAGE SIZE	99	72



people) a sharper drop occurs in per capita yields (0.17 and 0.16 kilograms for the 42 and 67-person villages versus 0.11 and 0.10 grams of dressed game for the 92 and 127-person villages). Yields per hunter likewise show a general trend of lower quantities as villages grow larger. These figures, however, are derivative of the average number of men who participate in a hunt and the number of hours out. Once again with some slight deviations the larger villages tended to go further and spend more time on the rami hunts. Although the total yields per day increase with increased village size (76% from 42 to 127-person village) the yields per hunter decrease as well as the per capita consumption (41% from the 42 to the 127-person village).

Deducting 20% of the dressed weight for non-edible parts,<sup>1</sup> per capita meat production for rami hunts indicate a close association of the 42 and 66-person villages and the 92 and 127-person villages. Per capita protein consumption for the 42-person village is 72% higher than for the 127-person village.

While per capita average rates of consumption are important as a general indicator of quantities of meat procured, the profile of the frequency of consumption is more revealing of the pattern of meat availability (Ross , 1979, Spath 1980). That is, even 16.13 grams of protein (the average per capita daily consumption derived from rami hunts in a village of 127 people) combined with other

sources could provide sufficient protein intake. But to determine the actual rate and pattern of meat consumption, the day by day yields must be examined rather than overall averages.

First, for the average 3.88 hunters per day for the 42-person village there was a 57% failure rate in rami hunts. That is, of the 109 individual hunts carried out in a 28-day period 62 produced no meat. Arithmetically, this is the equivalent of a hunter returning 16 days of a 28-day period without any catch at all. Actually there were 9 days of the 28 day period or about 1/3 of the time when all hunters out returned with nothing (table 13). Thus, the total 28-day yield of 203.84 kilograms of dressed game was dispatched and consumed over 19 days at a rate of 40.87 grams of protein per capita per day for the 19 days and zero protein (from hunts) for nine days.

But this still does not fully reveal the irregularity of meat consumption. Examining again the daily yields for the village of 42 persons, half (49.45%) of the game is acquired and eaten in only 3 days or approximately 10% of the time period, and 3/4 (76.72%) of the game is acquired in 7 days or 1/4 of the time (table 13a). During these 7 days, 85.11 grams of protein per capita are derived from the rami hunts.

In the 5 days when only animals weighing between 5 and 10 kilograms of game are dispatched, an average of 20.13 grams of protein are consumed for those five days. Since

the total amount of game taken on these 5 days amounts to 13% of the 28-day total and was acquired over 18% of the total time, this mid-range consumption, although still below average, approximates most closely the amount of daily meat consumption over the long run.

In category 3, animals weighing from 0.5 to 5 kg. yielded a per capita consumption of 11.45 grams per day. Here the relative frequencies are reversed from category 1. In 7 days or 25% of the time only 10% of the game was acquired.

In addition, since the daily yields are quite low, (3.18 to 4.62 kg of game) the distribution was frequently not village-wide. That is, a small catch was shared only by close kin and neighbors. As a result, in this 7-day low yield period only 86% or 36 people were included in a distribution. Therefore, 6 people over a 28-day period would not consume meat for an additional 1.67 days.

A similar pattern of meat consumption prevailed for a village of 127 people (table 14). Because of the larger number of hunters out on any given day (9 versus 4 for the 42-person village), the number of days when all failed was 33% lower than for the village of 42 persons. Nevertheless, the fact that 21% of the days resulted in village-wide failure when that many hunters were out is an indicator of the uncertainty of rami hunts.

Table 13. Profile of meat consumption for 28 days for a village of 42 people (Poreyanimopit<sup>n</sup>eri). All game is derived from rami hunts carried out from the home base.

Category	no. days <sup>a</sup>	%	total game killed (kg.)	% total killed	meat per cap. per day (gm.)	protein per cap. per day (gm.)
1 <sup>b</sup>	7	25.00	156.39	76.72	425.54	85.11
2 <sup>c</sup>	5	17.86	26.42	12.96	100.64	20.13
3 <sup>d</sup>	7	25.00	21.04	10.32	57.24	11.45
4 <sup>e</sup>	9	32.14	0	0	0	0
	28	100.00	203.84	100.00	ave.138.67	27.74

<sup>a</sup>data are derived from the averages of three 28-day periods recorded during field periods 15, 17, 18, 19.

<sup>b</sup>includes at least one animal above 10 kilos per day.

<sup>c</sup>only animals 5 to 10 kilos dressed weight were killed.

<sup>d</sup>only animals 0.5 to 5 kilos dressed weight were killed.

<sup>e</sup>no game for all hunters.

Table 14. Profile of meat consumption for 28 days for a village of 127 people (Patahamit<sup>n</sup>eri). All game was derived from rami hunts carried out from the home base.

Category	no. days <sup>a</sup>	%	total game killed (kg.)	% total killed	meat per cap per day. (gm.)	protein per cap per day. (gm.)
1 <sup>b</sup>	7	25.00	226.29	63.14	203.64	40.72
2 <sup>c</sup>	8	28.57	82.00	22.88	64.57	12.91
3 <sup>d</sup>	7	25.00	50.10	13.98	45.08	9.02
4 <sup>e</sup>	6	21.43	0	0	0	0
	28	100.00	358.39	100.00	ave.80.63	16.12

<sup>a</sup>data are derived from a 28-day period recorded during field periods 29, 30.

<sup>b</sup>includes at least 1 animal above 10 kilos.

<sup>c</sup>only animals 5 to 10 kilos dressed weight were killed.

<sup>d</sup>only animals 0.5 to 5 kilos were killed.

<sup>e</sup>no game for all hunters.

Figure 14. Total daily yield of dressed game for home base sorted in descending order.

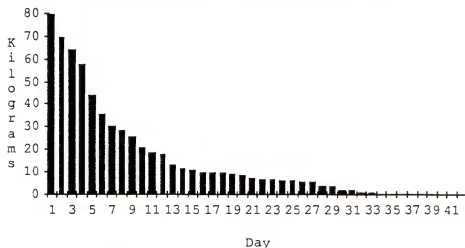


Figure 15. Total daily yield of dressed game for new garden sorted in descending order.

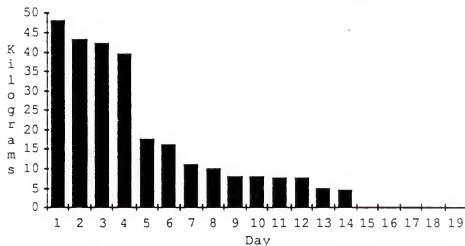
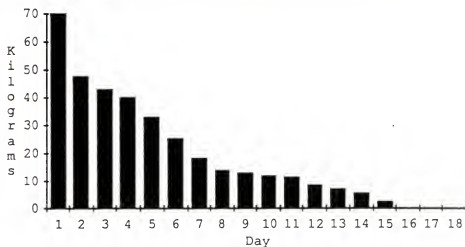


Figure 16. Total daily yield of dressed game for wayumi sorted in descending order.



### Heniyomou Hunts

Table 15 shows the productivity of multiple-day heniyomou hunts from 4 different size villages. The most notable results of these measurements is that, while, the heniyomou hunts yielded the highest quantities of meat per hunt (70 to 108 kilograms dressed game), productivity per hunter-hour was lower than that of rami hunts, especially in the larger villages. In a village of 92 persons an average of 16 men participate in expedition hunts which last an average of 5.20 days. On these hunts the men dedicate themselves exclusively to hunting for an average of 8.5 hours per day. Thus, the amount of time expended on a single heniyomou amounts to an average 718.25 hunter-hours, which is equivalent to one person participating in 109 day hunts with an average duration of 6.60 hours. Therefore, while the heniyomou was carried out only every 39 days each hunt entailed a very large investment of hunter-hours.

The average yield per hunter-hour on heniyomou hunts, in addition to being lower than day rami hunts, decreases as a community grows larger. That is, the total kilograms of meat per hunt do not increase proportionately to the number of hunters. In a village of 42 individuals an average of 8 hunters produced 0.23 kilograms of dressed game per hunter-hour. In a village of 92, an average of 16 hunters yield 0.14 kilograms per hunter-hour. In a large village of 127 inhabitants where 23 hunters participate in the

Table 15. Productivity of heniyomou hunts of four villages from 1979 to 1984.

Village Size	42 <sup>a</sup>	67 <sup>b</sup>	92 <sup>c</sup>	127 <sup>d</sup>
No. of <u>heniyomou</u> hunts	14	22	20	8
No. of days per hunt	4.64	4.98	5.20	5.06
No. of hunters per hunt	7.85	11.50	16.25	22.75
No. of hours per day	8.50	8.50	8.50	8.50
Total dressed game/hunt (kg.)	69.82	99.16	100.33	108.00
Yield/hunter-hour (kg.) <sup>e</sup>	0.23	0.20	0.14	0.11
Dressed game/capita (kg.)	1.66	1.48	1.10	0.85

<sup>a</sup>from field periods 19, 20, 21, 22.

<sup>b</sup>from field periods 21, 23, 25, 27, 28.

<sup>c</sup>from field periods 15, 17, 18, 19.

<sup>d</sup>from field periods 29, 30, 31, 32.

<sup>e</sup>the calculations for the rami hunts mentioned table 6, apply also to the heniyomou hunts.



heniyomou communal hunts, the yields were 0.11 kilograms per hunter-hour. Larger villages tend to go for slightly longer periods (average of 4.64 days for a village of 42 and 5.06 for a village of 127 people).

A reason for this drop in productivity per hunter-hour is that the bulk (62%, table 10) of the game on most heniyomou hunts consists of large animals such as the white-lipped peccary and the tapir. The number of peccaries killed does not increase proportionately with the number of hunters. A group of 8 hunters kills an average of 2.17 peccaries, when they encounter a herd. To maintain the same productivity per hunter-hour a group of 16 hunters would have to kill an average of 4.34 peccaries and 25 hunters would have to kill an average of 6.78. However, rarely are more than 4 peccaries killed regardless of the size of the hunting party [average of 2.75 (range 0-8) in all heniyomou hunts when peccaries are killed].

Another reason for the inverse relationship of village size and hunting productivity is that because many Amazonian game animals are highly mobile, success of a hunt, regardless of the size of the hunting party is often a question of chance encounter. Thus, the larger the hunting party the lower the hunter-hour yields on those hunts when little game is encountered. That is, the percentage of encounters does not increase proportionately with the percentage increase in the number of hunters. This is true

for all animals but most notably true for large game, such as peccaries and tapirs. Defining a successful heniyomou as one which yields sufficient game for a village distribution (at least one large animal or 30 kilograms of dressed game, the success rates for a village of 42, 67, 92 and 127 were 64%, 63%, 65% and 75% respectively. The 127-person village was as high as 75% because normally the 23 hunters split into 2 groups. One group of 8 hunters was successful 5 times out of 8 tries or 75% of the time. But the other half was successful on only 4 of 8 tries or 50% giving an overall average of 57%. Even using the 75% rate it represents an increase of only 11% in the success rate of the 92-person village while the population increase is 38%, and the number of hunters is 44% greater than in the larger group.

The fact that a distribution was made at a funeral ceremony (reahu), does not mean that the recipients were necessarily satisfied with the amount of meat. This is especially true when one village is invited by another to participate in a funeral ceremony. If the visitors travelled a long distance, and the heniyomou group returns empty-handed, the visitors cannot wait an additional 5 to 6 days for another try. Nor could their hosts feed them for so long. In fact, most host villages at the end of the intervillage funeral, having exhausted their plantains, leave for a wayumi trek in the forest.

On my most recent field stay from December 1987 to April 1988, the unreliability of heniyomou hunts was clearly demonstrated. Shortly before my planned departure in April the headman and his brother organized a heniyomou to provide meat for a funeral ceremony for their younger 20-year old brother who had died the year before. In keeping with Yanomami custom they had kept his ashes in gourds and were now going to mix them with a ripe plantain pap and drink them. I decided to attend the funeral before my departure.

Large quantities of green plantains were hung in the rafters of the shapono roof. They would be ripe and ready to boil into a sweet drink by the time the hunters returned. Almost all able-bodied men and many adolescents participated in the hunt (17 of 20 adult men and 6 adolescents for a total of 23 participants). During the drug-taking gathering the afternoon before, the headman had decided that they would go to the area of their last garden, Iro Kai, about an 7-hour walk away. In the past they had found the area to be productive for hunting the white-lipped peccary, their principal goal on heniyomou hunts.

But after 6 days of hunting they returned with no large game and just some smoked birds, a monkey and a couple of snakes. The total yield was 22 kilograms of dressed game. The 17 adult hunters had invested a total of 867 hours on the hunt yielding a mere 0.03 kilograms of game per hunter-hour.

Since the hunt was a failure they organized another one in only five days because they were running low on plantains and peach palm fruit and wanted to leave for a trek. Once again plantains were hung to ripen, this time by the other brother. On this hunt only 13 of the 20 men chose to participate, as many were disappointed from the previous one and were less enthusiastic about spending 5 days in the forest with little to eat.

They decided to try another area northwest of Iro Kai. In 5 days, again they returned with an insufficient quantity of game for the funeral. Thus, the planned trek and my own departure were delayed once again.

Finally, on a third try in which even fewer men participated (11 adults), they returned to Iro Kai, the area of the first attempt. They did so because, although previously they had seen no peccary tracks, they said that the herds had now arrived at that part of the forest, "hei tēhē thēpē rukei reikēt<sup>h</sup>a". And, in fact, they did encounter a herd of peccary in the same area as the first hunt and brought back 1 young and 2 adult peccaries as well as some small animals. Thus, they were able to invite the village of Eshemowēt<sup>h</sup>eri and have their funeral ceremony. In all it had taken them a period of one month (27 days) to acquire meat for the event.

While 60% of heniyomou hunts are initiated to procure meat for distribution in a reahu funeral ceremony, as stated

earlier, many are made simply to provide meat for the community. This is particularly true when the rami hunts over an extended period of time (2 to 3 weeks) are very unproductive. Although the data show that a hunter goes on a rami hunt twice a week and brings back an average of 1.73 kilograms of dressed game, these are long-term averages and do not reveal the lean periods when virtually no game is brought in. During these periods (up to three weeks) some individuals have gone 3 or 4 or even 5 straight hunts without killing anything at all. A hunter, after his third or fourth failure, may say, "I'm going hunting even though I will not kill anything (Ya huu pëo)".

It is difficult to indicate when these lean periods occur. They seem to be more common after several months residence at the home base. Just before a trek the hunters go out less often. Nevertheless, since a village does not reside at any locale for more than 4 months and frequently much less, sharp declines in yields over time are not very demonstrable.

When these lean periods in rami yields occur a heniyomou is initiated into forest regions beyond the limits of the rami hunts.<sup>2</sup> If the heniyomou is successful they eat the meat with the remaining plantains and set out on a trek. Even if the heniyomou is not successful, if it occurred in the context of an extended period of rami hunt failures, the community leaves on a trek carrying the remaining plantains.

If there are still plantains in some of the gardens the owners at a future time will return from the trek to harvest and carry them out to the camp. Carrying plantains to the wayumi camp during the first few days before the village travels out of range is quite common. Since there are 20 to 30 individually owned gardens it is highly unlikely that all men run out of mature plantains at the same time. Those that do not are sure to return for them lest they overripen or are stolen by a community member or someone from another village. It is during the trek when the entire community abandons the shapono that people from other villages steal plantains from their gardens, oftentimes provoking inter-village hostilities. Most often frustrated visitors who have traveled a long distance only to find an empty shapono are the culprits. But on some occasions a friendly neighboring village also on trek arrives close to their neighbors' gardens and cannot resist helping themselves to the crops. This of course causes a great frustration and anger when the community returns from the trek expecting to find crops which have matured in their absence.

#### NOTES

1. The proportion of an animal used for food varies by species and culture. White (1953), estimates 70% of the live weight of peccaries to be usable meat. My estimate is that 80% of the dressed (gutted) animal is eaten by the Yanomami. Sows (1984) estimates that 27.6% of the live weight is lost in the dressing process. This amount plus 20% of the dressed weight equals a total loss of 42.4%. That is, 57.6% of the live weight is consumed. However, since the Yanomami eat virtually all of the viscera, I estimate that they lose only 10% in the gutting and

therefore, the usable parts are approximately 72%, very comparable to the 70% of White (ibid).

2. This is not to be confused with the mistaken assertion by Hames (1980), that the Yanomami open up more distant hunting zones as game animals become depleted in nearby ones. See the discussion of this in chapter 5.

#### CHAPTER 4 WHY THE YANOMAMI TREK AND MAKE NEW GARDENS

The potential of horticultural practices for supporting sedentary villages of up to 1000 people or more in tropical forest environments has long been accepted and quoted in anthropological literature (Carneiro 1960, 1961; Roosevelt 1980). As we have seen in the previous two chapters, the Yanomami are not fully sedentary and do not live in large communities (average size for 21 villages in the Orinoco-Siapa block is 72 people).

As I mentioned in Chapter 3, the Yanomami embark on a trek when harvestable plantains in their gardens are exhausted. It is imperative that they leave the village at this point since they depend on bananas and plantains for 78% of their calories. What needs to be explained, however, is why they do not plant more extensive gardens at their home base instead of clearing new gardens at distant locales. My observation of 23 gardens showed that the reason for not extending existing gardens was not for a shortage of cultivable land. Some communities, in fact, after years of absence resettle at an old site and clear a new garden very near the old abandoned one. The explanation



given by the gardeners themselves is that they like to move to different areas because there is "good forest" there.

One approach to determining why they move away from the home base as well as trek in the deep forest for as much as 60% of the yearly round is to measure the benefits that are derived from doing so and to determine what would be the consequences of not doing so. It is evident from the data already presented that given the Yanomami traditional subsistence practices in the context of their culture, larger and/or more sedentary communities are necessarily associated with lower hunting yields and depletion of wild foods. I contend that the pattern of base site, new garden, and wayumi trek relocations form part of an adaptive system which enables the community to maintain a nutritionally adequate diet especially with regard to levels of protein and fat intake derived from hunting.

This system of relocations works well for villages of approximately 40 to 80 people. But it is not viable for villages that grow beyond approximately 90 people. The reason for this is that the larger the village the more difficult and less productive it becomes for the group to trek as a unit. Village fissioning restores the communal group to a size which is able to subsist on the available wild foods at a given locale in the forest.

### New Gardens

Each community in the Orinoco-Siapa region has a minimum of two, frequently three, and in some cases four gardens in different stages of development. As I already mentioned, because there is rarely a shortage of potential gardening lands either contiguous to existing gardens or in the near vicinity we must look elsewhere for the explanation of why the Yanomami fail to expand the existing gardens. As seen in table 3, a man spends a year-round average of 1.11 hours per day on gardening work. If the days when he is not residing at a garden are subtracted (i.e. while trekking or visiting) the average increases to 1.52 hours per day of garden work. During the more intensive period of clearing and burning his garden, which lasts from 6 to 8 weeks, he works approximately 6 hours a day 4 times a week yielding an average of approximately 3.4 hours per day during the 6-8 week period. The days when he does not garden he hunts or gathers or stays at home making arrows or other utility articles. Even with a 50% increase of the average of 1.52 hours per day while in residence at a garden, the daily input would be only 2.28 hours.

The factors contributing to clearing new gardens at distant locales (beyond commuting range, 1/2 to 1 day walk away) are twofold. First, the time requirements of hunting and other subsistence and social activities (particularly group drug-taking and shamanistic chanting) preclude the

possibility of working on the gardens more intensively or for more extended periods of time. That is, because there is no storage of foods, they must be acquired on a daily basis. Gardening at best can only be a part-time endeavor as time must be dedicated to acquiring meat and wild foods especially during the high energy expenditure period of garden clearing. It is during this period that the products of women's gathering are an essential contribution to the daily diet. During the period of heavy gardening hunting is still carried out. The game that is acquired is critical for supplementing the small but frequent sources of protein from insects, crabs, and small fish gathered by women.

It would be possible to curtail some of their activities, such as visitation of other communities for trade, or shamanistic drug-taking in the afternoons, and intensify gardening activities, but they do not. Thus, invariably as gardening is spread out over an extensive period the producing crops and wild foods run out, and the village must move on. It would appear that this gardening pace is maintained with these moves (treks and new gardening camping) in mind.

It is difficult to show an actual decline in hunting yields because the villagers remains only two to four months at any one site. Nevertheless, some animals, especially the game birds (Pipile cumanensis and Crax alector), are rapidly exhausted or frightened away, and at the end of three to

four months the yields of these animals alone drop 36%. Other animals are killed too infrequently and sporadically to detect a decline in these short periods. In any event, as already mentioned, overall hunting yields per capita increase by 45% at the new garden site and 91% on wayumi over the average yields at the home base (table 8).

At the end of 3 to 4 months stay at one site the quantity of food gathered by the women also decreases. Local stands of fruit or legumes as well as crabs and fish in the nearby creeks are readily exhausted after several months of intensive daily exploitation. This can be offset by the coming in season of other foods. But normally there is a hiatus in these transitions which is coupled with an exhaustion of plantains, leaving the community with little to eat. Eventually, because of lack of sufficient food, further occupation of the site becomes difficult if not impossible. These conditions stimulate a relocation to a different area where work is begun on a new garden (or to a trek, as discussed below) where game animals and wild foods are more readily acquired.

#### Firewood

Firewood for the Yanomami is a very important and critical fuel. All cooking is done on wood fires, mostly by roasting peeled plantains on hot embers upon which they are constantly turned and repositioned until they are cooked. To

do this, much wood must first be burned down to coals. Meat is also either smoked or boiled with wood fires.

Most wood is consumed, however, in the fires which are kept burning from dusk to dawn to provide warmth against the damp and chilly night air. Throughout the night every hour or so someone is awakened by the chill and revives the fire. Not only large quantities but good qualities of hard woods must be collected to satisfy this need. Soft or rotten wood smokes and burns out quickly.

Thus a women must spend a year-round average of 0.6 hours per day (table 3) acquiring fuel for the family hearth. The most desirable and easily acquired wood comes from the fallen trees in the gardens. In the late afternoon, after they have returned from the gathering trips, the women converge on their husbands' or sons' gardens to chop the fallen trees. Since the garden is normally quite close to the shapono they can get a full basket of wood in about 45 minutes to 1 hour. Since they normally possess only very worn steel axes they can only chop the softer outer section of the tree. Thus, the supply of fallen trees quickly runs out after daily exploitation for 3 to 4 months. Then the women must begin to go to the forest further from home in search of good quality firewood. On many of these occasions I accompanied the women to determine how much time was actually dedicated to acquiring firewood.

The rate at which this cost/benefit ratio increases varies directly with the size of the village (table 16). The larger the village the more quickly the fallen branches and trees in the nearby forest are depleted. In villages of over 80 to 90 people the women begin to go longer distances for wood and invest 1 to 2 hours per trip. When nearby supplies become scarce, some women bring home a few small logs found along the way on their gathering trips.

#### Village Trekking

The wayumi trek shares some characteristics with the move to new gardens. Both usually involve areas beyond the rami hunt range that have had little or no recent exploitation of game or wild foods. In both areas hunting yields and gathering productivity are higher at the outset of occupation than at the home base (table 8). The 1976 data (table 9) show a 32% increase at the new garden and 52% on wayumi. The major difference between the two kinds of moves is that the new garden is occupied continuously for one to three months, and men engage in gardening activities. Thus, while the first weeks of occupation offer fresh sources of wild foods, firewood, and game, productivity levels eventually drop to home base levels.

The trek, however, is a highly mobile form of exploitation. During four different treks new campsites were made on an average of every 2.25 days (range 1 to 12 days). During the trek the men spend more time on hunting

Table 16. Time invested in acquiring firewood by women of 4 communities at the home base.

Village size	42 <sup>a</sup>	67 <sup>b</sup>	92 <sup>c</sup>	127 <sup>d</sup>
No. women cutting firewood/day	4.32	7.68	10.08	13.92
No. minutes/event	47	41	58	72

<sup>a</sup>42 days from field period 18.

<sup>b</sup>31 days from field periods 21, 27.

<sup>c</sup>49 days from field period 15.

<sup>d</sup>48 days from field periods 29, 30, 31.

than they do at either the home base or new garden. One reason for this, of course, is that there is no gardening to do. Another is the motivational factor. Since a fresh area is being hunted and the hunts are more successful, they go out more frequently (20% more than at the home base and 32% more than at the new garden sites, table 8).

In addition to the immediate increase in hunting yields and gathered foods, the trek provides a number of other benefits. While trekking could be conceived as a last resort response to food depletion, the Yanomami do not find it to be a disagreeable activity. The change from the communal house, which is quite hot in the dry season, to the cool forest away from trodden trails and heaps of garbage is a welcome relief. Biting insects that plague the inhabitants of the shapono are much diminished in the forest. After 2 or more months of residence some of the trails leading from the shapono where people relieved themselves in the night, afraid to go further into the dangerous forest, begin to smell of feces.

In the wayumi camp each family makes its own provisional shelter in a unstructured pattern. Thus, the spatial relationships are different from those at the communal house. As I stated earlier, families which lived at opposite ends of the shapono become close neighbors. This creates new patterns of food sharing since neighbors are always included in a distribution. In general, the new



interpersonal relationships tend to strengthen village cohesion.

Treks vary greatly in length and distance traveled. When a large stand of fruits or other wild foods are available, the community may relocate itself only several hours from the shapono (approximately 10 kilometers) for part of the trek. Nevertheless, the same advantages mentioned above prevail and hunting is extended to areas barely reached from home base. It is during these less distant treks that any remaining plantains are harvested from the home base gardens and carried to the wayumi camp.

Other times the community travels far (20 to 30 kilometers), and moves frequently, exploiting less concentrated and more dispersed foods. On such occasions the women are able to catch many more crabs and small fish in numerous creeks and streams, about 1 to 2 meters in width, which form an interlacing web throughout the forest, than they were able to catch in the creeks and streams near the home base prior to setting off on a trek.

During wayumi treks when wild foods are less abundant, or more importantly, less concentrated, the products of the trek may become insufficient for feeding the entire village when it is camped at one place. Villages that grow larger than approximately 90-100 people therefore frequently split into 2 groups while on wayumi (table 17). In very large villages (approximately 150 people or more) three separate

wayumi groups may form, each trekking to a different area to eventually reunite and take up communal residence at the home base. These temporary splits also help to reduce tensions which have grown in the communal house. After a separation of several weeks or months of camping in the forest, anger is dissipated and the factions come together again. Gregor mentions similar effects of the "dry season village" of the Mehinaku (1977:217) The number of camps and the frequency of fissions while on wayumi varies directly with village size (see table 16 for 10 villages ranging in population from 42 to 151 persons).

In addition to the problem of finding sufficient quantities of food, wayumi treks involving large numbers of people are physically awkward. The campsite sprawls out over an extensive forest area, and people tend to form sub-groups that inhibit communal interaction. Moreover, large camps have a much greater impact on wildlife.

A group of 127 people as opposed to one of 42 or 66 is more likely to spook nearby game while cutting down trees to construct temporary shelters. The din of 30 machetes whacking at saplings and 30 others cutting vines and leaves for roofing disturbs the game over a wide area. As the women forage for crabs and fish, fetch water, and chop firewood their movements also are heard over considerable distances.

Table 17. Village splits during wayumi treks.

Village size	# treks	village splits on trek	%	village fissioned by 1988
42 <sup>a</sup>	5	0	0.0	no
62 <sup>b</sup>	7	1	14.3	no
83 <sup>c</sup>	2	1	50.0	yes
92 <sup>d</sup>	4	3	75.0	yes
111 <sup>e</sup>	3	2	66.7	yes
127 <sup>f</sup>	3	3	100.0	yes
132 <sup>g</sup>	4	4	100.0	yes
149 <sup>h</sup>	5	5	100.0	yes
151 <sup>i</sup>	4	4	100.0	yes

<sup>a</sup>periods 21, 22, 24, 26.

<sup>b</sup>periods 21, 22, 24, 26.

<sup>c</sup>period 18.

<sup>d</sup>periods 15, 16, 17, 18.

<sup>e</sup>periods 4, 8.

<sup>f</sup>periods 32, 33, 34.

<sup>g</sup>periods 1, 5, 8, 16.

<sup>h</sup>periods 1, 4, 5, 8, 16.

<sup>i</sup>periods 8, 16, 24, 26.

### Meat Distribution And Village Cohesion

The tendency of villages to fission as they grow beyond 90 to 100 people is in part related to the role the distribution of meat plays in maintaining village unity. Meat is the overriding preoccupation in the daily life of a Yanomami village. It is not only a subject of discussion among the men during their leisure time but also is something about which they are reminded at every meal. The Yanomami have a strong preference for eating meat accompanied with plantains. They do this by alternating bites of each and chewing them together. The verb t<sup>h</sup>ehiai means to eat meat and another food together. So strong is this preference that on the rare occasion when plantains or other foods are not available to complement the meat the men decline to hunt or fish.

Most often the reverse situation is true. Plantains are eaten alone with little to accompany them. This is because an individual gets to eat meat only once every 3.4 days or about twice a week. This figure does not reflect quantity since I counted consumption of only 30 grams (approximately 1 ounce) of meat as a meat-eating event. It is on many of these occasions when they eat only plantains that they express their desire to eat meat (ya naiiki, which means I am hungry for meat). When meat is available, the portion per adult male amounts to no more than an average of approximately 100 grams (approximately 3.5 ounces). Women

and children receive even less. Therefore, in order to satisfy their hunger they eat large quantities of roasted plantains (up to 10 at one meal) along with the meat. Moreover, when a piece of meat is available, a larger number of plantains are eaten during a meal than when plantains are eaten alone [an average of 850 grams (1.9 pounds) are eaten as an accompaniment to meat and 510 grams (1.1 pounds) when eaten alone]. Thus, by consuming more plantains, they are able to make a small piece of meat into a filling meal. Whenever I was observed eating meat alone someone always rushed to bring me cooked plantains and admonish me to not eat meat "t<sup>h</sup>ehimi", that is without combining plantains with it. So strong is this preference that when I continued eating the meat alone it caused some annoyance and discomfort for those observing me.

Every bit of the meat except the toughest gristle is eaten. Even the smallest bones are cracked open to get the marrow. On rare occasions when there is a large amount of meat, scraps are given to the dogs, especially to those that participated in the hunt.

Thus, the Yanomami rarely get their fill of meat. Indeed, it is because the portions are normally small and infrequent that the term naiki is so often heard. This general situation is so manifest that even an observer who is not documenting meat procurement and dietary patterns recognizes it. Chagnon, early on noticed this: "Meat is

always the most desirable food and is always considered to be in short supply. It is a happy occasion when one of the hunters bags a tapir, for everyone gets a large share of it" (1977:91).

### Meat Distribution

Probably the most important social aspect of Yanomami meat consumption is the distribution of a large cooked game animal to the adult males within the community. This distribution is the only village-wide form of reciprocal food exchange and therefore, is a principal integrating mechanism. Except for ceremonial occasions, all other foods are consumed by the producer and his or her immediate family. Although senior men eat freely of their own kill, younger hunters up to about 25 years of age believe they would loose their hunting abilities if they did not refrain from eating their catch.

Therefore, the reciprocal exchange of meat and other foods between individuals becomes a critical factor for the maintenance of village cohesion. It has been asserted (Levi-Strauss 1963) that marriage between lineages serves as a means of creating alliances. But marriages occur only when there are preexisting bonds. That is, marriage between lineages within a village or between villages is the result, not cause, of good relations. Considering the number of difficulties and conflicts that can arise among spouses and

in-laws, it is just as likely that the marriage can lead to the breakdown of previous good relations.

The principal way the Yanomami establish good relations is by giving gifts. The simple act of giving fosters the creation of bonds between lineages. There are times when disgruntled villagers who feel they have been slighted become argumentative and aggressive in their complaints. Omissions in village distribution can be rectified on a subsequent occasion and tendency towards bad relations readily reversed. But if a slight is not rectified it can lead to further deterioration of relationships to a point where it is very difficult to reverse.

Likewise, virtually all inter-village relations are based on the exchange of goods. The principal purpose for visiting another village is to acquire something which will be reciprocated at a future time. Friendship is defined by acts of giving and receiving. It cannot exist without the exchange of goods. They say "I like you, so therefore, give me something".

Feasts to which entire villages are invited all have the central activity of consuming large quantities of food supplied by the hosts. As a culmination of the festivities a group trading session occurs in which goods are given to the visitors. At a future date the hosts will travel to the guests' village and request foods as part of an ongoing exchange. It is evident that exchange has a purpose in

addition to the acquisition of needed items. Indeed, identical items, such as bows or hammocks, are often exchanged from one person to another.

Nevertheless, if the guests feel that they are not being fed enough or if the hosts feel their visitors are overindulgent or staying too long, quarrels may develop and insults hurled which leads to very bitter feelings or outright physical violence. A not uncommon explanation for the inception of inter-village hostilities is that the hosts are very stingy with the meat or fish they had caught, or some other food.

When villages have an extended period of good relations marriages may be consummated between them. The most common arrangement for the first several years of a marriage, especially when the spouses are young, is for the husband to live at the wife's village with the status of a son-in-law. His esteem and acceptance is determined primarily by the quantity of game he procures.

#### Preparation and Distribution of Game

While the chopping of firewood and the cooking and distribution of most foods is carried out by the women, all matters relating to large animals such as peccary and tapir are the domain of the men. The meat is usually boiled over fires made from large logs acquired by the men. A mat of leaves is laid out upon which the carcass is butchered. As the Yanomami no longer make pots and interfluvial villages



are rarely able to acquire very large aluminum pots through trade, the cooking must be done piecemeal in small or medium-size pots and is attended to by one or more men over six to eight hours, often throughout the night. Each cooked piece is hung from the rafters of the shapono until the cooking is completed.

When it is time to distribute the meat another mat of leaves is made and all the pieces are assembled. Close male relatives, such as brothers or sons, squat around the mat and eat little pieces stripped from the various portions, an activity which is called tikai. Normally a brother of the hunter or the person who cooked the animal does the final partitioning. The hunter watches nearby and offers advice as to what size pieces should be cut and how much should be given to the various individuals.

Usually the senior man of each sub-lineage is given meat first and the quantity can be two to three times greater than the average portion given other men. The meat is delivered to the individual by a small child, as most adult men do not walk freely around the entire shapono, especially when a mother-in-law may be present. Meat is given only to men and they in turn allocate pieces to their wives and children. The men who are supervising the portioning and distribution discuss who must be given better pieces. This decision is based on the individual's age, status, and kin relationship.

### Village Size and Meat Distribution

For villages of up to approximately 80 people there normally is a sufficient quantity of meat on a peccary to distribute to all the adult men. The size and quality of the cuts vary according to importance and relation of the receiver. The meat must in turn be shared with the recipient's wife and children and possibly with his or his wife's mother.

In villages of more than approximately 80 to 90 people the portions must be cut quite small, and frequently some individuals are left out of the distribution (see table 18). While important men almost always receive generous cuts, on some occasions middle and lower status males are given very small undesirable cuts or none at all.

Sometimes a man who thinks he has been slighted purposely slights the individual he thought had neglected him. This occurs even if the first individual is a man of high status. Since such men are even less tolerant of being slighted than others, animosities and quarrels are likely to develop (Good 1988b). If a man is repeatedly slighted he may move to another village. In 1976, a young adult male by the name of Tikiwë became so furious he took his family and belongings and moved to a neighboring village which had

Table 18. Intra-village meat distribution before village fissioning occurred (115 people). All weights in kilograms

Animal	no. of events	ave. cooked weight	no. of pieces	ave. wt. per piece	range of weights	no. adult men	no. men omitted
Tapir	5	30.14	33	0.91	0.09-3.64	38	2
Peccary- white- lipped	15	7.37	22	0.34	0.11-0.88	24	7
Peccary- collared	11	5.18	19	0.27	0.18-1.10	24	6

Table 19. Intra-village meat distribution after village fissioning (41 people).

Animal	no. of events	ave. cooked weight	no. of pieces	ave. weight per piece	range of weights	no. adult men	no. men omitted
Tapir	3	28.24	18	1.57	1.40-5.81	11	0
Peccary- white- lipped	10	7.48	12	0.62	0.88-3.72	11	0
Peccary- collared	9	4.98	12	0.41	0.75-2.58	11	0

previously split off from the one in which he was living. There he also had relatives, brothers and brothers-in-law, and hoped to be treated better.

As the village gets even larger (125 to 130 people), meat distributions reach proportionately fewer people and tend to become confined to the lineage of the hunter. Thus, animosities build and village cohesion becomes strained. Since the capture of large quantities of game is not a frequent event, meat becomes by far the most desired food of the forest. To be left out of a distribution after all the excitement of the arrival of a large animal frustrates one's desire to eat meat. But even more importantly, it reflects the sentiments of the distributor and calls into question the non-recipient's status in the village.

When discontent over distribution of meat rises to the lineage or sub-lineages level the possible consequences for the integrity of the village are more serious. For, rather than just one or two individuals being disgruntled, an entire lineage, each with its "big man", is pitted against the other in public outcry, including insults and threats, all of which can lead to actual physical violence (see Good 1989). Most often, however, immediate violence is avoided, but village cohesion begins to deteriorate. The sub-lineages of the community become estranged, and a kind of fissure opens up which leads to additional conflicts over

events or behavior which would otherwise have been minimized or overlooked.

In 1977, when I arrived at the previously uncontacted village of Kopariwetheri, a community of 149 people, the leader of one lineage was shouting at his counterpart of another lineage and accusing him and his relatives of consistently slighting his people in the distributions of meat. I learned that several weeks earlier a collared peccary had been killed and most of it was distributed within the hunter's lineage. Only the leader and a few other people in the other lineage had received portions, and not very good ones at that. Disgruntled, they had split away on a wayumi. Now, 3 weeks later they were just reuniting at the shapono and the verbal exchanges immediately flared up again.

As I stated earlier, the collard peccary is one of the larger animals of the Amazon weighing over 16 kilograms, dressed weight, and is not frequently caught. Even though they had captured this concentrated source of meat, there was not enough for distribution to all the men of this large community. Since they live in one open circular structure all facing each other, it is difficult for some members of the community to watch others eating meat when they have none.

In this case, the big man of the lineage which had killed the peccary was shouting back that they should not be

angry because they are also naiki, (meat hungry) and that there just was not enough to go around. This did little to appease the other villagers, primarily because the Yanomami believe that when they are slighted by someone it is because that person does not have the best feelings for them, and that he is not their friend. Otherwise, would he not have slighted someone else?

On the following wayumi trip to the forest the two lineages split up again and went in different directions. Later they came back together for a brief period but eventually fissioned and are now two separate communities. The village-wide reciprocal giving of meat can act as an integrative force, but only when the village remains small enough for everyone to be included.

CHAPTER 5  
ALTERNATIVE HYPOTHESES OF AMAZONIAN SUBSISTENCE

Historical Background

The question of why Yanomami villages fission and relocate arose in the early 1970's in the context of a debate over the causes of intervillage raiding (Harris 1974, Tavis 1975, Chagnon 1975). The focus on the importance of game depletion for village size and permanence quickly spread to include other Amazonian Indians. Although the significance of game availability in the Amazon basin gained considerable popularity in this decade, it had been suggested even earlier than the 1970's. Robert Carneiro pointed out the potential limiting effect on interfluvial communities which derive much of their protein from game animals:

Among tribes for whom hunting still constitutes an important part of subsistence, the depletion of game animals in the vicinity of the village may dictate moving long before other conditions would warrant it (1961:77, quoted in Sponsel 1981:289).

Carneiro is even more specific in his description of the Amahuaca, an interfluvial tribe living primarily in headwater locales:

In habitats of this type it is hunting, not fishing, which must be relied on for the bulk of the protein in the diet. This fact is of special



significance for settlement pattern, since a heavy reliance on hunting is incompatible with sedentary village life. Even communities as small as 15, which are characteristic of the Amahuaca, severely deplete the game in their vicinity in a year or two. After that, a village may need to be moved several miles away if the supply of meat is to continue to be met without an inordinate amount of walking time being required. The result is that a horticultural- and-hunting society living in a habitat with only small streams will be unable to take full advantage of the potentialities of agriculture for settlement size and permanence (1968:245, quoted in Sponsel 1981:245).

That same year Donald Lathrap also emphasized the limiting nature of game animal resources of interfluvial hunters and gathers, although he believed that the present day examples were displaced populations driven from the várzea to a harsher interior existence (1969:28-29).

Although the issue was attracting more attention, it did not come to the fore until 1975, when Daniel Gross published an article on protein capture in Amazonia in the *American Anthropologist*. This article combined with the writings of Harris (1974, 1979,) stimulated a number of other field workers in Amazonia and other areas to gather quantified data on subsistence, especially hunting activities. Gross offered the hypothesis that protein capture in Amazonia was a limiting factor on population size, settlement patterns and village permanence. Since that time the "protein hypothesis" has become one of the major debates within anthropology. It was the importance of this issue and the lack of any extensive and reliable quantified data on it

which led me to select it as the basis of my field research. While I was carrying out my initial fieldwork in 1975-1977, others were attempting also to quantify data and address the issue in other parts of Amazonia and tropical rainforest environments (Vickers 1980; Beckerman 1979). Vickers, although his initial research demonstrated a marked depletion of game at his Siona-Secoya village in northeastern Ecuador, later denied that this depletion had much if any relationship to permanence of settlement among that group (1988:1522). However, the fact that he carried out his fieldwork in a riverine community which hunted with shotguns and apparently made so many canoes that they exhausted the local cedar trees leading the village to relocate, clouded the issue. Beckerman, who worked among the Barí, claimed that protein in Amazonia has been greatly underestimated. But, he had in mind not only game, but many alternative sources of protein which are primarily available in riverine locales.

The only previous attempt at examining Yanomami settlement patterns as they relate to subsistence, was made by Raymond Hames at the Ye'kwana village of Toki where a few Yanomami who had split off from their village had annexed themselves. For the issue at hand, this site suffers from the fact that the Yanomami were not an independent community, but were located on a major river, were much acculturated, and were dependent on a Ye'kwana community

Jacques Lizot, carried out a much more detailed and careful study in true Yanomami communities (1977). While his results demonstrated that the two communities he studied had more than adequate protein consumption at the time they were observed, he did not discuss depletion of game and village relocation.

As already mentioned, although a number of authors have claimed that the issue is closed, the fact is, that not all the evidence was in. I believe this dissertation has presented data that game availability and meat consumption are major factors influencing village size, permanence and fissioning. By establishing gardens in distant areas and trekking in the forest for weeks or months during the year, a community is able to maintain a home base longer than if they remained there and tried to subsist close to home. Also, by trekking and camping out at new garden sites located out of the range of home base hunts, hunting yields are maintained at levels which provide sufficient protein intake for community members. Thus, a pattern of garden relocation, and intermittent nomadism has enabled the Yanomami to prevent hunting yields from decreasing as low as they would if they did not trek, and has allowed them to subsist on plantain gardens of moderate size and wild foods.

Because Hames' articles have by now been frequently quoted as representative Yanomami hunting behavior, I will review his data and conclusions in greater detail.

### Hunting and Village Permanence

In an effort to refute the hypothesis relating game availability to village size and sedentariness, Raymond Hames attempted to demonstrate, on the basis of data gathered in a "Yanomamö" village at Toki on the Padamo River, that the Yanomami are able to remain sedentary by rotating their hunting zones, and thus concluded that game depletion is not an important cause of village movement among the Yanomami (1980:33). In order to evaluate Hames' data I shall first clarify the size, location and economic activities of the "Yanomamö" village at Toki. In addition to my own observations on a brief visit to Toki, the accounts of three Ye'kwana informants who lived for long periods at Toki are considered here.

The Padamo River is a major tributary of the upper Orinoco River, and historically is an area of Ye'kwana Indian settlement. Nevertheless, in the past, several small groups of Yanomami had migrated into this area and settled near or attached themselves to Ye'kwana villages on the Padamo and its tributaries. These have most often been splinter groups which consist of a few families which set out on their own rather than remain with their Yanomami communities.

Originally these Yanomami groups were spurned by the Ye'kwana, who were not at all receptive to having them as neighbors. Historically the two tribes had been enemies,

but more importantly, because the Ye'kwana were much more advanced materially the Yanomami living nearby constantly begged for, or when possible stole material goods and crops, particularly manioc, the staple food of the Ye'kwana.

The Yanomami persisted in living nearby, and eventually the Ye'kwana began to accept the presence of small groups consisting of a few families. As already mentioned, groups of approximately 35 or fewer residents exist only in close association with another community.

To overcome the effects of differences in material possessions and in garden production and to stop the persistent begging, the Ye'kwana began to integrate the Yanomami into their community. They taught the Yanomami how to cultivate manioc. In so doing the Ye'kwana men helped the Yanomami clear the forest, and in return the Yanomami also assisted the Ye'kwana in making their gardens. Thus, Yanomami and Ye'kwana began to work together in integrated groups that followed basic Ye'kwana subsistence practices. The Ye'kwana provided axes and machetes, and the Yanomami reciprocated with their labor. Likewise, the Ye'kwana women instructed Yanomami women in the Ye'kwana technique of preparing manioc meal (mañoco), a food greatly prized by the Yanomami, but which required a technology that the Yanomami did not possess.

Acculturated Ye'kwana normally work through the week in their gardens and reserve the weekends for hunting, and the

Yanomami increasingly came to adopt this pattern of subsistence activities. Frequently they were invited to accompany the shotgun bearing Ye'kwana in their motorboats to hunt at distant tributaries of the Padamo River, in areas which would otherwise be beyond Yanomami hunting ranges, certainly for hunts that lasted only 2 days. In other instances, however, though they did not accompany the Ye'kwana, they received part of the catch because of their close association with them in cooperative garden activities and through affinal relationships.

One such example of annexation of Yanomami at a Ye'kwana community is the extended family which Hames (1980) refers to as Toroboteri. This family actually first settled with the Ye'kwana community at their previous site of Sharanaña, retaining the name as part of that of the new community which was called Toki-Sharanaña. This Yanomami group still earlier was part of a community called Thoropit<sup>h</sup>eri which split up after having been raided, one part moving to the Ye'kwana village. There they were readily accepted since one of the Ye'kwana had taken a Yanomami wife from the Thoropit<sup>h</sup>eri group, a woman who still lives at Toki as does her son by her Ye'kwana husband.

The first reference to this Yanomami family group appeared in a report by Chagnon and Hames in Science in which the authors referred to the "the Yanomamö village of Toroboteri, a small group of 35 individuals..." (1979:911),

and according to Chagnon and Hames, the Toki had more than an adequate level of protein consumption.

My objection to their publication at the time was the inappropriateness of discussing Yanomami protein consumption on the basis of a group of economically dependent families living at a highly acculturated Ye'kwana community. In 1979, Jacques Lizot and I co-authored a letter to Science with the intent of informing the readers the true nature of this community (see appendix A for the text of this letter). In this communication we pointed out that the village Hames refers to is, in fact, not a Yanomami village and that the community of 35 individuals referred to is a composite of two separate groups, one of which does not even live at Toki.

In a subsequent article after this letter had been circulated and sent out for review but not published by Science, Hames admitted that the village of Thoropit<sup>h</sup>eri was an "adjoining satellite " community of the Ye'kwana village of Toki (Hames 1980:35). He states that one "section" of the village consists of 20 Yanomami who live in 2 houses (not in the traditional communal shapono) and another group of 15 who live in another house "ten minutes" away (Hames 1980:36). He also mentions 18 Yanomami who have been "adopted" into Ye'kwana households, and states that the "Yanomami are motivated to reside near Ye'kwana primarily to gain access to trade goods" (ibid:36). In still a later

article in referring to the same field stay and data, Hames revised the number of Ye'kwana from 76 to 88 and stated that the Ye'kwana village of Toki and the Yanomami village of Toropo-teri "occupy the same area with one Toropo-teri house within the village confines of Toki, while the other Toropo-teri house is a kilometer distant." Thus the one "section" of the village now occupied one instead of two houses. So 20 Yanomami living directly with the Ye'kwana combined with another 15 located a kilometer away are lumped together and called the village of Toropo-teri. Hames later revised the walking time from 10 to "14 to 17 minutes and says that the village of Toropo has 2 "segments, Toropo 1 and Toropo 2" (1983:417). Yanomami villages are not comprised of segments. As I have already mentioned, the most outstanding characteristic of the physical makeup of a Yanomami village is that the entire community lives in a single communal structure, called the shapono. It is within this structure that the products of hunting, gathering, and gardening are distributed and redistributed in accordance with the social structure. In some instances two communal structures may exist very close to each other (as close as 50 meters), but the inhabitants comprise two separate communities. The Yanomami called this arrangement përiwo poakao, and the relationship is usually short-lived (Good 1978). Hames says of these 20 Yanomami living within the village of Toki with the Ye'kwana that in the past there had



been a "degree of economic interdependence in reciprocal garden preparation" but that while he was there it had "almost vanished" (1982:360).

All of my informants asserted that there were only 10 to 15 Yanomami living in two enclosed houses and they consisted of an individual, his brothers-in-law, and his son-in-law and their families, and that the second component of this "village of 35 individuals" is actually a separate community. They also stated that, at most, there were only five men in the group at Toki who could be considered hunters. Because of the marital ties, cooperative hunting and meat sharing occurred so frequently that this group of Yanomami at Toki can not be considered a community separate from the Ye'kwana. Likewise, contrary to Hames' statement that such interdependence had "almost vanished" during his field stay (1982:360), the Yanomami hunting activities were to a large extent determined by their cooperative garden activities with the Ye'kwana and the time restrictions entailed in Ye'kwana work patterns and gardening techniques, restrictions which Hames refers to in his article.

In their original report Chagnon and Hames asserted that Yanomami protein consumption is more than adequate and that the arguments proposing protein as a limiting factor had no factual basis. It is important to point out from the outset that their results indicate that more than one third of the animal protein intake is derived from fish (Chagnon and

Hames 1979), much above the 6.4% reported by Lizot (1977:511) for an interfluvial community and the 10% for a community located on the Orinoco River. My results indicate 2.8% and 5.6% of protein obtained from fishing for two interfluvial communities (see appendix B). Hames defends the use of riverine data to explain a traditional interfluvial culture by stating that his community had moved to the river "only in the last 30 years" (1980:58). The fact is, after residing for a mere 5 years on a major river where they have immediate access to Western fishing technology the Yanomami become thoroughly adapted to a riverine mode of subsistence, even when they are not living at or near a community of expert riverine Indians such as at Toki (see Beckerman 1979, for other sources of protein available to riverine communities).

Observation of a single group, even if that group is a traditional autonomous community, is inadequate for documenting hunting patterns and inter-community hunting relationships. Hames claims regional applicability for his findings by asserting that the same pattern of rotating hunting zones is found at other communities in the Padamo basin. Two of these communities have a relationship of dependency similar to that of the Yanomami at Toki. The rest live at an evangelical mission station and are highly acculturated. The absence of a regional study of independent interfluvial communities severely handicaps any

effort to describe the complexities of traditional Yanomami hunting activities (see Gross 1983). In order to measure the significance of protein capture for village size and permanence, the effects of population growth on hunting yields and village cohesion must be determined. For this, longitudinal data over a number of years is indispensable. Hames attempted to fulfill this requirement by relying on native historical accounts of past settlements and past hunting activities, many of which took place before the informant was born.

#### Hunting Environments

The hunting zones of the Padamo River region described by Hames are clear evidence that the environment of the area where he resided is totally different from that of traditional interfluvial Yanomami settlements. He states that a "hunting zone can best be described as a drainage basin having a linked series of trails with the largest of these trails paralleling the stream or river which serves as the nexus of the drainage" (1980:39). He attributes this nexus of hunting trails to the abundance of game in riparian areas, especially ecotonal regions between the riverine forest, varzea (river bottom land) and terra firme (upland) through which the hunting trails run. Except for about 5% of Yanomami villages which have been attracted to settlements like Toki and mission stations, the Yanomami do not live in or near riverine forest or river bottom lands.

With one exception all of the hunting zones which he lists are located in riverine environments.

As we saw in the previous chapter, the waterways most often exploited by the Yanomami are small creeks and streams no more than 1 to 2 meters in width. Interfluvial communities, in fact, do not maintain "hunting trails" as Hames describes them. Rather, trails cut across these streams in numerous directions linking old gardens, wayumi trekking camps and other communities. The hunters travel any of these trails and leave them at different points (t<sup>h</sup>iherimou) and cross the forest in search of game. Even when a larger stream is located nearby, the hunters construct their communal shelter away from it, preferring to get their drinking and cooking water from the smallest of streams. In the dry season most of these streams are reduced to a trickle and after several months revert to dry beds where holes must be dug to obtain water. During these periods one can walk for hours through the forest and not encounter any flowing water.

### "Hunting Zones"

Fundamental to Hames' analysis of hunting behavior at Toki-Sharanaña is his assertion that the Yanomami maintain discrete "hunting zones" (1980). It is true that the Yanomami and the Ye'kwana have a name for each major stream and river. Any society must be able to orient itself to its environs and be able to refer to specific places that it

frequents. What Hames' zones indicate are simply the names of the rivers in the Padamo River region. They tell us little about the range of hunting in each river basin. What they do clearly indicate is that the Yanomami of Toki do virtually all of their hunting on the Padamo and its tributaries, as well as a tributary to the Orinoco River, further evidence of the atypically riverine orientation of this group.

Nor do these zone designations tell us much about the amount of time spent hunting at different points en route to each zone. Yanomami hunters recognize and make reference to a continuum of specific streams, swamp areas, ponds, stands of fruit trees, and other geographical characteristics within their subsistence territories. Those areas outside of the subsistence territories which are more remote from the communal house, rather than being discrete zones, are only general regions, and the areas exploited vary greatly from hunt to hunt. As will be discussed below, even distant areas are never exploited as a separate region to the exclusion of the areas en route to them. Rather they are simply areas lying along the agreed upon direction where the group ultimately arrives on the heniyomou hunt. Hunting is not reserved for a specific locale or zone, and begins from the moment the hunters leave the communal house and ends when they arrive home.

During heniyomou hunts game are captured at locales on both the trip out and the return trip, at points between the communal house and the most distant hunting camp. It is not uncommon for the heniyomou hunters to spend three to four days in the most distant encampment and kill very little, and on the return trip get peccary or tapir three to four hours from the communal house.

"Hunting Zone Rotation"

Hames further states that the Yanomami rotate these hunting zones when game becomes depleted and that each zone is "fallowed" until such time as stocks are replenished. The evidence he offers of this practice is based not on first hand observation but rather on native historical accounts of the exploitation of these zones derived from interviews with Ye'kwana and Yanomami informants. Affirmations such as that Cua (zone 2) was hunted "intensively" between 1945 and 1969 and then "lightly" from 1970 to 1974..." (1980:56-57) by two Yanomami communities (neither of which Hames studied), derived from Yanomami or even Ye'kwana informants is rather uncertain as to its reliability. All three Ye'kwana informants that I questioned, for instance, asserted that Cua was never left unexploited.

As already mentioned, prior to the establishment of Toki both the Ye'kwana and Yanomami lived at Sharanaña (Hames zone 9) which is very close to Cua, and when the Ye'kwana

moved from there to Toki the Yanomami followed as part of the community. Nevertheless, Cua, remained en route to Watama (zone 3), the Ye'kwana's second most heavily exploited zone (according to Hames' data) and still relatively quite close to Toki, Cua was also close to the route traveled by motorboats driven by Ye'kwana which the Yanomami frequently had opportunity to do. More importantly, any switch in emphasis from one hunting zone to another as described by Hames would have occurred as the result of village relocation from his zone 9 to Toki, the kind of adaptive response which Hames claims to be unnecessary. Since Hames' data represent approximately 7 months of observation over approximately one year, he presents no documented evidence of such rotation of zones while he was in residence at any one site. Instead, he delimits 12 zones, which he himself defined, and which are simultaneously exploited to varying degrees by the Ye'kwana and the Yanomami. That some are more productive than others at any point in time, and more intensively exploited is not evidence that those less productive and less frequently exploited areas are being fallowed. There is no basis to assume that all areas of the forest, even those which are hunted, had equal initial productive potential.

Because, as Hames states, a number of these zones are shared with other communities, it is highly unlikely that there would be a synchronized fallowing of certain zones

even if hunting yields drop. Hames offers no evidence to demonstrate declining yields in any zone over time with or without population growth. The fact is all areas within range of a Yanomami village are exploited at same time. As I have said, the few Yanomami individuals living at Toki represent a grouping which falls below the size of any presently independent intact Yanomami community. As mentioned before, their ability to survive in such a small group depends on their being, in fact, part of the Ye'kwana community.

What Hames' data suggest is that, because of a the shotgun-bearing Ye'kwana community at Toki, the hunting areas around the village have been so depleted that practically no one no ever hunts there, a condition not found in interfluvial communities or even in Yanomami riverine communities which have few if any shotguns. As a result, the Ye'kwana have been forced to hunt in increasingly distant areas. In addition, there are so few productive hunting areas that the Yanomami hunters of Toki have to share their most favored and most productive zone with another Ye'kwana community located on the Orinoco River. Hames claims that the Yanomami of Toki do not hunt in the very productive areas of their Ye'kwana village mates, yet his data show that they hunt most often in a zone which is also exploited by the Ye'kwana of another village. A similar point was made by Gross (1982).



The Ye'kwana hunters of Toki have been able to compensate for local game depletion by hunting very distant areas with the aid of boats and outboard motors. To meet the cost of gasoline and outboard motor parts, as well as guns and ammunition, the Ye'kwana have had to participate in a cash economy by selling their crops to local missionaries and in the market at Puerto Ayacucho, the capital of the Amazon Territory of Venezuela. Because the small groups of Yanomami that reside at Toki and other Ye'kwana sites desire to be part of this process. To acquire manufactured goods, they have had to relinquish their traditional economic, political and social modes of behavior.

#### Distance and Hunting Productivity

Hames states that his data indicate a positive correlation between the distance of the hunting zones from the village and productivity (1980:51). Because of this he wonders why so much time is spent hunting in zones nearer the village when yields per hunter-hour are much higher in the more remote zones. He finds this to be a "perplexing problem in optimal feeding theory in relation to optimal patch choice," a theory he believes explains or should explain Yanomami hunting behavior. His final explanation for this discrepancy is that the "time constraints" of horticultural activities do not allow frequent long distance hunts. Those time constraints he observed among his group, however, are not characteristic of independent Yanomami

communities, but rather are a result of Ye'kwana manioc horticultural practices.

Hames commits a major ethnographic error when he states that the Yanomami at a new settlement first hunt the local area and then "open up new areas when it becomes depleted of game" (1980:54). As we have seen in chapters 3 and 4 this assertion is at variance with the Yanomami hunting patterns I observed over long periods of time at both riverine and interfluvial communities. The Yanomami engage in local rami and distant heniyomou hunts during all phases of a garden site occupation. They are complementary forms of hunting each with its own objectives and strategies.

Thus, as we have already seen, while the heniyomou expedition hunts yielded the highest quantities of meat per hunt, in a village of 67, productivity per hunter-hour was only 60% of the rami hunts (0.20 kilograms on the heniyomou versus 0.34 kilograms of dressed game per hunter-hour on rami hunts). In a village of 127 the heniyomou rates were only slightly more than half of the rami hunts. It can be seen then, that Hames' correlation of distance and hunting yields when productivity is measured by hunter-hour is not substantiated by data from interfluvial independent Yanomami community hunting.

Hames wonders why the Yanomami do not go on more heniyomou hunts if the yields are higher. Keeping in mind that, in fact, the yields per hunter-hour are actually lower

than those of rami hunts and the sacrifice the hunters make to carry out these hunts, it would be more appropriate to ask, not why they do not go on more heniyomou hunts, but rather why they go at all. Approximately 60% of all heniyomou hunts are carried out to provide meat for distribution at funeral ceremonies (reahu). This distribution serves not only as a unifying force within the community, but in those funeral ceremonies which involve other communities, meat is given to the guests, thus strengthening inter-village bonds.

It seems clear that the principal motivation to carry out a communal heniyomou hunt is the desire to eat meat and to provide for the entire community. While one can invoke the law of the minimum and postulate that hunters have an innate tendency to acquire as much meat with the least effort possible, the evidence here demonstrates that they are also prepared to walk long distances and invest a great deal of time and energy to acquire meat in the absence of more locally available sources. On these occasions they are not concerned with efficiency or returns per hunter-hour, but with total amounts of meat per capita. In fact, given the much lower yields per hunter-hour for the heniyomou hunts, such hunts constitute the strongest evidence in support of the limited availability of local game, particularly when a village grows large and remains at one site. It also explains the centrifugal tendency to exploit

areas of the forest which are remote from the settlement site, be it by means of heniyomou hunts, wayumi treks or community relocation to distant new gardens.

### Trekking

The most conclusive evidence that Toki was a non-Yanomami village is the complete lack of mention of the wayumi communal trek in Hames' 3 articles dealing with Yanomami subsistence (Chagnon and Hames 1979; Hames 1980; Hames and Vickers 1982).

As I have shown, actual Yanomami communities periodically abandon the shapono and travel through the forest in pursuit of wild foods and game animals for as much as 40% of the time. Although hunting yields increase by 91% on wayumi the home base hunting, the most frequent reason for initiating a trek is the depletion of plantains in the gardens and, to a lesser extent, declining yields of gathered foods.

Trekking is a predominant and critical activity of all Yanomami villages, an activity which I observed in every community between the Orinoco and Siapa rivers. In fact, one of the greatest risks of visiting another village is to walk, for days to reach it only to find the community not at home. It was a major problem in my expeditions to the Siapa River where I planned to get new guides and food at each village stop on the way (Good 1981). On one trip more than half the villages were on a trek when we passed through.

Trekking also is the single activity which distinguishes the Yanomami from other horticulturists who, because of different diet base, are able to remain more sedentary. That Hames' research village does not trek is the strongest indication that this group has abandoned its traditional shapono residence, married into the Ye'kwana community, and adopted Ye'kwana gardening practices. Most importantly, they have come to rely on the Ye'kwana staple food, manioc meal (mañoco) and casabe cakes, as a major source of calories. Plantains, on the other hand do not provide a continuous harvest (at least for the Yanomami and are not storable. As I have said, the Yanomami of Toki remain sedentary because they are part of a highly westernized Ye'kwana community which itself does not trek. They have been able to compensate for the depletion of local game by increasing their reliance on fish, taken from the large river on which they live, and by participating in Ye'kwana long distant hunts.

Because in traditional Yanomami communities most hunting is done within the the radius of the rami hunt, and because the yields per hunter-hour are highest there, it is this area where the maintenance of hunting yields is most critical. The area of the rami hunts is adjusted by making moves to old and new gardens and by leaving the communal house for wayumi treks in the forest. Thus, it is the area of day hunts where productivity rates are most readily

affected, and it is that area which has been most affected by long-term residence at the Ye'kwana village of Toki.

Hames states that the Ye'kwana of Toki in an effort to reduce raiding have "confiscated shotguns from the Yanomamö", and have "threatened to kill any Yanomamö attempting to raid against the Yanomamö who reside with them" (1983:114). And in regard to village relocation as it may relate to resources (I have already stated that their residence at Toki occurred when they simply followed the Ye'kwana from their previous site of Sharanaña) Hames continues to increase our understanding of this community by informing us that the Torobo are considering moving again (away from Toki) not because of game or other resource depletion but "because the Ye'kwana no longer want them as co-residents" (1983:415).

#### Conclusions

As just mentioned, the most salient and distinctive characteristic of the Yanomami subsistence system is the community trek. Relatively few tribes practice trekking (notwithstanding Werner, 1983:225). This is particularly so if we restrict trekking to periods of time ranging from several weeks to several months by the entire community.

That the Yanomami still engage in trekking quite possibly could shed some light on their historical background. It has been hypothesized that the Yanomami, who most likely originated in the Parima Highlands, probably

were hunters and gatherers and did not practice agriculture to any significant degree until the introduction of plantains and bananas in post-Columbian times (Harris 1974:101-102). While the inception of plantain gardening enabled a more sedentary village life and a more abundant source of calories for the Yanomami, it has not incorporated them into a fully stable agricultural system. The fact that the Yanomami live away from rivers and possess little technology for exploiting aquatic resources, suggests a prior emphasis on hunting and only a minor reliance on fishing. Furthermore, even today the Yanomami represent a hunter and gatherer culture which has not made maximum use of horticulture and has not entirely given up the nomadic behavior of the past. When planted in limited amounts and not throughout the year plantains do not provide a steady source of food. Moreover, unlike manioc they cannot be stored or left unharvested until needed. This, as I described above, is part of the reason for Yanomami trekking.

Long ago Robert Carneiro (1956) demonstrated that there is no environmental limitation on growing enough crops to assure a reliable supply and enable a village to remain sedentary. Thus, it would appear that the reason the Yanomami plant fewer crops than they might is because they plan to carry out treks. The trek is not a burdensome task which is carried out under duress and only when food

supplies run out at the home base. To the contrary, it is an agreeable and welcome activity, and as demonstrated above. During treks, meat consumption almost doubles, and new sources of wild foods are exploited. Thus, the hunting and gathering ways are used to tide the community over when crops are exhausted or when they are still not ready to harvest. In this regard the Yanomami are similar to the Sirionó hunters and gatherers observed by Allan Holmberg:

Although agriculture has been practiced for many years by the Sirionó (they may originally have been a strictly nomadic people), it has never reached a sufficient degree of development to prevent their remaining a fairly mobile people. On the whole, its practice is subsidiary in the total economy to both hunting and collecting. One of the reasons for this may be that the game supply of an area becomes scarce before the rewards of agriculture can be reaped, thus entailing a migration of the band to other areas to search for game (1969:67).

As I have already mentioned, Yanomami communities which still live in the interfluvial regions today spend as much as 40% of their time away from their gardens, camped in the forest, hunting and gathering for survival. But this subsistence pattern is increasingly being influenced as each year passes and will change even more in coming years as outside contact increases. Those communities today which have access to machetes and axes clear larger gardens, remain more or completely stationary, and participate in fewer and shorter treks or none at all. Villages which have been attracted to Western settlements on the major rivers



and which have acquired the technology to exploit the vast aquatic resources of rivers like the Orinoco and its tributaries, have virtually abandoned traditional trekking patterns.

But for those communities which live in the hinterland on the slopes and crests of the rolling hills, trekking has remained a crucial means of assuring adequate caloric and protein consumption.

APPENDIX  
LETTER TO SCIENCE

The text of the letter previously published in Harris (1984, 1987) is as follows:

To the Editor:

Upon returning from an extended period of fieldwork among the Yanomami, the report by Chagnon and Hames (Science, Vol 213, 2 March 1979, pp 910-913) came to our attention. Although this comment comes long after the publication of their report, we feel it will be of importance to those interested in Yanomami studies and issues discussed.

Independent of the theories involved in the debate over the significance of protein in Yanomami diet and subsistence activities, our major objection to the report by Chagnon and Hames is the nature of the data presented as representative of Yanomami subsistence. We question the legitimacy of this data for the following reasons:

The site where Hames carried out his fieldwork is in fact primarily a Makiritare or Ye'kwana community to which a small group of Yanomami has attached itself and is characterized by its economically dependent relationship to the much larger Ye'kwana community. Approximately 15 to 20

Yanomami live within the Ye'kwana village itself in separate enclosed houses rather than the open Yanomami communal structure which provides the spatial framework for Yanomami society. Another 15 to 20 Yanomami live a short distance outside the village of Toki.

This community is located on a river at the extreme limit of Yanomami settlements and is comprised of approximately 90 Ye'kwana who themselves are so acculturated as to render studies of even their traditional culture questionable. The Yanomami men of this community work for the Ye'kwana in their gardens mostly in activities of manioc cultivation (a very minor Yanomami crop). They are paid partly on a cash basis in Venezuelan currency which they often use to purchase tools and food brought to the settlement by the Ye'kwana. In the past the Yanomami constructed enclosures for cows and planted hay.

The women also work for the Makiritare in the task of preparing the manioc flour (mañoco), a non-Yanomami food and technology. It is prepared in large quantities and sold to outsiders, particularly the missionaries who supply their missions along the Orinoco River. It is also transported by the Ye'kwana and sold downriver at the capital town of the Amazon Territory. For their labor the Yanomami women are in part paid with clothing made on the Makiritare sewing machine at the village. All of these conditions, of course,

have altered the traditional hunting and gathering and horticulture activities of the Yanomami men and women.

The Ye'kwana possess numerous canoes (foreign to Yanomami), equipped with outboard motors and a fishing technology consisting not only of nylon line and metal hooks, but nets and buoys with which they exploit the relatively large river on which they live (an atypical Yanomami habitat). In addition, they own shotguns and lights which are used for nighttime hunting and fishing (non-Yanomami activities). Larger boats from this settlement periodically go down the Orinoco River to purchase steel goods, shells for shotguns, food and gasoline for the outboard motors. For years this community has had a political co-op stimulated by partisans of Venezuelan national parties. All of this is available directly or indirectly to the Yanomami living at or near Toki and serves as a attraction to other Yanomami who frequently visit. The nearby Evangelical Mission has also had a strong influence on Toki.

We believe that the conditions at this community (as well as its extreme geographic marginality) have so drastically altered this group of Yanomami that they cannot legitimately be represented as Yanomami society. For this reason we believe the data presented have little importance for the discussion of protein and warfare among the Yanomami. Both of us have done extensive research on

Yanomami protein consumption (Good's forthcoming article is based on five field trips comprising 38 months of direct contact over a six-year period). We do not believe that any data are better than no data if they are not representative of what they purport to demonstrate. If Chagnon and Hames had informed the readers of the nature of their community the data could have been accepted for what they are worth. But to present their data as "Yanomamö animal protein consumption" has only served to muddle an already difficult area of research.

As a final point of clarification, Lizot would like it to be known that contrary to Chagnon and Hames (reference note 15 in their report) he did not collaborate with them nor receive any funds from H.F. Guggenheim Foundation for protein studies. Funds received were for genealogical studies and it is for that purpose that they were expended.

s/s Kenneth R. Good, Department of Anthropology,  
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s/s Jacques Lizot, Laboratoire d'Anthropologie Social,  
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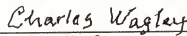
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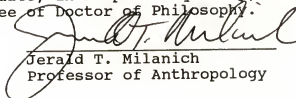
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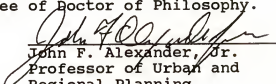
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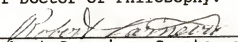
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Robert Carneiro, Curator of  
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This dissertation was submitted to the Graduate Faculty of the Department of Anthropology in the College of Liberal Arts and Sciences and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August, 1989

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